STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

STANDARD LOW BID PROJECT

January 31, 2006

PAVING IMPROVEMENTS
MOAB REGIONAL
TRUCK DRIVER TRAINING AREA

DEPARTMENT OF PUBLIC SAFETY
MOAB, UTAH

DFCM Project Number 05112550

Johansen & Tuttle Engineering
90 South 100 East
Castle Dale, Utah 84513
Phone: (435) 381-2523
Fax: (435) 381-2522

TABLE OF CONTENTS

Current copies of the following documents are hereby made part of these contract documents by reference. These documents are available on the DFCM web site at http://dfcm.utah.gov or are available upon request from DFCM.

DFCM General Conditions dated May 25, 2005.
DFCM Application and Certification for Payment dated May 25, 2005.

Technical Specifications :
Drawings:

The Agreement and General Conditions dated May 25, 2005 have been updated from versions that were formally adopted and in use prior to this date. The changes made to the General Conditions are identified in a document entitled Revisions to General Conditions that is available on DFCM's web site at http://dfcm.utah.gov

NOTICE TO CONTRACTORS

Sealed bids will be received by the Division of Facilities Construction and Management (DFCM) for:

PAVING IMPROVEMENTS - MOAB REGIONAL TRUCK DRIVER TRAINING AREA
DEPARTMENT OF PUBLIC SAFETY – MOAB, UTAH
DFCM PROJECT NO: 05112550

Bids will be in accordance with the Contract Documents that will be available at 10:00 AM on Tuesday, January 31, 2006 and distributed in electronic format only on CDs from DFCM, 4110 State Office Building, SLC, Utah and on the DFCM web page at http://dfcm.utah.gov. For questions regarding this project, please contact Dan Clark, DFCM, at (801) 538-3725. No others are to be contacted regarding this bidding process. The construction budget for this project is $140,000.00.

A **MANDATORY** pre-bid meeting will be held at 10:00 AM on Thursday, February 9, 2006 at the Moab Regional Center Public Safety Office, located at 1165 South Highway 91, Moab, Utah 84532. All bidders wishing to bid on this project are required to attend this meeting.

Bids will be received until the hour of 3:00 PM on Wednesday, February 22, 2006. **DURING THE 2006 LEGISLATIVE SESSION, THE BIDS WILL BE RECEIVED, OPENED, AND READ ALOUD IN THE CONFERENCE CENTER BUILDING AT THE UTAH STATE FAIRPARK, 155 NORTH 1000 WEST, SALT LAKE CITY, UTAH**. Note: Bids must be received at the Conference Center Building at the Utah State Fairpark by the specified time

Bid security, in the amount of five percent (5%) of the bid, must be submitted as stated in the Instruction to Bidders.

The Division of Facilities Construction and Management reserves the right to reject any or all bids or to waive any formality or technicality in any bid in the interest of DFCM.

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
Marla Workman, Contract Coordinator
4110 State Office Building, Salt Lake City, Utah 84114

PROJECT SCHEDULE

PROJECT NAME:	**PAVING IMPROVEMENTS - MOAB REGIONAL TRUCK DRIVER TRAINING AREA DEPARTMENT OF PUBLIC SAFETY – MOAB, UTAH**
DFCM PROJECT NO.	**05112550**

Event	Day	Date	Time	Place
Advertisement Placed	Sunday	January 29, 2006		Multi-Media
Bidding Documents Available	Tuesday	January 31, 2006	10:00 AM	DFCM, 4110 State Office Bldg, SLC, UT or DFCM web site *
Mandatory Pre-bid Site Meeting	Thursday	February 9, 2006	10:00 AM	Moab Regional Building Public Safety Office 1165 South Highway 91 Moab, UT
Last Day to Submit Questions	Wednesday	February 15, 2006	4:00 PM	Dan Clark e-mail danclark@utah.gov
Final Addendum Issued	Friday	February 17, 2006	4:00 PM	DFCM, 4110 State Office Bldg, SLC, UT or DFCM web site *
Prime Contractors Turn In Bid and Bid Bond	Wednesday	February 22, 2006	3:00 PM	Conference Center Bldg Utah State Fairpark 155 North 1000 West Salt Lake City, UT **
Sub-contractor List Due	Thursday	February 23, 2006	3:00 PM	DFCM Fax (801) 538-3677

* **DFCM's web site address is http://dfcm.utah.gov**

** **Due to the limited parking on Capitol Hill and anticipated shortage of parking during the 2006 Legislative Session, all bids will be received, opened, and read at the Conference Center at the Utah State Fairpark. Refer to map on the DFCM web site for directions (http://dfcm.utah.gov/project_center/ads_solicitations.htm)**

BID FORM

NAME OF BIDDER _____ DATE _____

To the Division of Facilities Construction and Management
4110 State Office Building
Salt Lake City, Utah 84114

The undersigned, responsive to the "Notice to Contractors" and in accordance with the "Instructions to Bidders", in compliance with your invitation for bids for the **PAVING IMPROVEMENTS - MOAB REGIONAL TRUCK DRIVER TRAINING AREA – DEPARTMENT OF PUBLIC SAFETY – MOAB, UTAH - DFCM PROJECT NUMBER 05112550** and having examined the Contract Documents and the site of the proposed Work and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of labor, hereby proposes to furnish all labor, materials and supplies as required for the Work in accordance with the Contract Documents as specified and within the time set forth and at the price stated below. This price is to cover all expenses incurred in performing the Work required under the Contract Documents of which this bid is a part:

I/We acknowledge receipt of the following Addenda: _____

Item	Spec. Section	Description	Unit	Quantity	Unit Price	Total Price
1.	8	Mobilization	LS	1	$_____	$_____
2.	10	Hot Mix Asphalt (PG58-22) (1/2-inch max.)	Sqft	62,320	$_____	$_____
3.	21	Excavation	Sqft	62,320	$_____	$_____
4.	23	Granular Borrow (Pit Run)	Sqft	62,320	$_____	$_____
5.	23	Untreated Base Course (1-inch max.) 6-inches thick)	Sqft	62,320	$_____	$_____
6.	32	In-let Box Type 1 and Type 2	Each	6	$_____	$_____
7.	32	Concrete Curb and Gutter (24-inch)	LF	1,060	$_____	$_____
8.	32	Concrete Curb and Gutter (30-inch)	LF	602	$_____	$_____
9.	43	12-inch ADS Pipe	LF	10	$_____	$_____
10.	43	21-inch ADS Pipe	LF	693	$_____	$_____
11.	91	Chain Link Fence	LF	300	$_____	$_____
12.	93	Traffic Striping Paint	LS	1	$_____	$_____

For all work shown on the Drawings and described in the Specifications and Contract Documents, I/we agree to perform for the sum of:

_____ DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

I/We guarantee that the Work will be Substantially Complete by **May 26, 2006** after receipt of the Notice to Proceed, should I/we be the successful bidder, and agree to pay liquidated damages in the amount of $**500.00** per day for each day after expiration of the Contract Time as stated in Article 3 of the Contractor's Agreement.

This bid shall be good for 45 days after bid opening.

Enclosed is a 5% bid bond, as required, in the sum of _____

The undersigned Contractor's License Number for Utah is _____

Upon receipt of notice of award of this bid, the undersigned agrees to execute the contract within ten (10) days, unless a shorter time is specified in the Contract Documents, and deliver acceptable Performance and Payment bonds in the prescribed form in the amount of 100% of the Contract Sum for faithful performance of the contract.

The Bid Bond attached, in the amount not less than five percent (5%) of the above bid sum, shall become the property of the Division of Facilities Construction and Management as liquidated damages for delay and additional expense caused thereby in the event that the contract is not executed and/or acceptable l00% Performance and Payment bonds are not delivered within the time set forth.

Type of Organization: _____ (Corporation, Partnership, Individual, etc.)

Any request and information related to Utah Preference Laws: _____

Respectfully submitted,

_____
Name of Bidder

ADDRESS:

_____

_____

_____
Authorized Signature

INSTRUCTIONS TO BIDDERS

1. Drawings and Specifications, Other Contract Documents

Drawings and Specifications, as well as other available Contract Documents, may be obtained as stated in the Notice to Contractors.

Any person or firm that fails to return the complete set of Drawings and Specifications, or other contract documents, in good condition within ten (10) days after the time set for receiving bids, will forfeit the deposit. Notwithstanding this, if the Contract Documents are provided on a compact disc, the compact disc does not need to be returned.

2. Bids

Before submitting a bid, each contractor shall carefully examine the Contract Documents, shall visit the site of the Work; shall fully inform themselves as to all existing conditions and limitations; and shall include in the bid the cost of all items required by the Contract Documents. If the bidder observes that portions of the Contract Documents are at variance with applicable laws, building codes, rules, regulations or contain obvious erroneous or uncoordinated information, the bidder shall promptly notify the DFCM Representative and the necessary changes shall be accomplished by Addendum.

The bid, bearing original signatures, must be typed or handwritten in ink on the Bid Form provided in the procurement documents and submitted in a sealed envelope at the location specified by the Notice to Contractor's prior to the deadline for submission of bids. During the 2006 Legislative session, bids will be received, opened, and read at the Utah State Fairpark Conference Center Building, 155 North 1000 West, Salt Lake Ctiy, Utah.

Bid bond security, in the amount of five percent (5%) of the bid, made payable to the Division of Facilities Construction and Management, shall accompany bid. THE BID BOND MUST BE ON THE BID BOND FORM PROVIDED IN THE PROCUREMENT DOCUMENTS IN ORDER TO BE CONSIDERED AN ACCEPTABLE BID.

If the bid bond security is submitted on a bid bond form other than DFCM's required bid bond form, and the bid security meets all other legal requirements, the bidder will be allowed to provide an acceptable bid bond by the close of business on the next business day following notification by DFCM of submission of a defective bid bond security. NOTE: A cashier's check cannot be used as a substitute for a bid bond.

3. Contract and Bond

The Contractor's Agreement will be in the form bound in the specifications. The Contract Time will be as indicated in the bid. The successful bidder, simultaneously with the execution of the Contract Agreement, will be required to furnish a performance bond and a payment bond, both bearing original

signatures, upon the forms provided in the procurement documents. The performance and payment bonds shall be for an amount equal to one hundred percent (100%) of the contract sum and secured from a company that meets the requirements specified in the requisite forms. Any bonding requirements for subcontractors will be specified in the Supplementary General Conditions.

4. Listing of Subcontractors

Listing of Subcontractors shall be as summarized in the "Instructions and Subcontractor's List Form", which are included as part of these Contract Documents. The Subcontractors List shall be delivered to DFCM or faxed to DFCM at (801)538-3677 within 24 hours of the bid opening. Requirements for listing additional subcontractors will be listed in the Contract Documents.

DFCM retains the right to audit or take other steps necessary to confirm compliance with requirements for the listing and changing of subcontractors. Any contractor who is found to not be in compliance with these requirements is subject to a debarment hearing and may be debarred from consideration for award of contracts for a period of up to three years.

5. Interpretation of Drawings and Specifications

If any person or entity contemplating submitting a bid is in doubt as to the meaning of any part of the drawings, specifications or other Contract Documents, such person shall submit to the DFCM Project Manager a request for an interpretation thereof. The person or entity submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by addenda duly issued and a copy of such addenda will be mailed or delivered to each person or entity receiving a set of documents. Neither the DFCM nor A/E will be responsible for any other explanations or interpretations of the proposed documents. A/E shall be deemed to refer to the architect or engineer hired by DFCM as the A/E or Consultant for the Project.

6. Addenda

Any Addenda issued during the time of bidding shall become part of the contract Documents made available to the bidders for the preparation of the bid, shall be covered in the bid, and shall be made a part of the Contract.

7. Award of Contract

The Contract will be awarded as soon as possible to the lowest, responsive and responsible bidder, based on the lowest combination of base bid and acceptable prioritized alternates, provided the bid is

reasonable, is in the interests of the State of Utah to accept and after applying the Utah Preference Laws in U.C.A. Title 63, Chapter 56. DFCM reserves the right to waive any technicalities or formalities in any bid or in the bidding. Alternates will be accepted on a prioritized basis with Alternate 1 being highest priority, Alternate 2 having second priority, etc.

8. DFCM Contractor Performance Rating

As a contractor completes each DFCM project, DFCM, the architect/engineer and the using agency will evaluate project performance based on the enclosed "DFCM Contractor Performance Rating" form. The ratings issued on this project will not affect this project but may affect the award on future projects.

9. Licensure

The Contractor shall comply with and require all of its subcontractors to comply with the license laws as required by the State of Utah.

10. Right to Reject Bids

DFCM reserves the right to reject any or all Bids.

11. Time is of the Essence

Time is of the essence in regard to all the requirements of the Contract Documents.

12. Withdrawal of Bids

Bids may be withdrawn on written request received from bidder prior to the time fixed for opening. Negligence on the part of the bidder in preparing the bid confers no right for the withdrawal of the bid after it has been opened.

13. Product Approvals

Where reference is made to one or more proprietary products in the Contract Documents, but restrictive descriptive materials of one or more manufacturer(s) is referred to in the Contract Documents, the products of other manufacturers will be accepted, provided they equal or exceed the standards set forth in the drawings and specifications and are compatible with the intent and purpose of the design, subject to the written approval of the A/E. Such written approval must occur prior to the deadline established for the last scheduled addenda to be issued. The A/E's written approval will be in an issued addendum. If the descriptive material is not restrictive, the products of other manufacturers specified will be accepted without prior approval provided they are compatible with the intent and purpose of the design as determined by the A/E.

14. Financial Responsibility of Contractors, Subcontractors and Sub-subcontractors

Contractors shall respond promptly to any inquiry in writing by DFCM to any concern of financial responsibility of the contractor, subcontractor or sub-subcontractor.

15. Debarment

By submitting a bid, the Contractor certifies that neither it nor its principals, including project and site managers, have been, or are under consideration for, debarment or suspension, or any action that would exclude such from participation in a construction contract by any governmental department or agency. If the Contractor cannot certify this statement, attach to the bid a detailed written explanation which must be reviewed and approved by DFCM as part of the requirements for award of the Project.

BID BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed, (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the STATE OF UTAH, hereinafter referred to as the "Obligee," in the amount of $_____ (5% of the accompanying bid), being the sum of this Bond to which payment the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted to Obligee the accompanying bid incorporated by reference herein, dated as shown, to enter into a contract in writing for the _____ _____ Project.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if the said principal does not execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the principal, then the sum of the amount stated above will be forfeited to the State of Utah as liquidated damages and not as a penalty; if the said principal shall execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the Principal, then this obligation shall be null and void. It is expressly understood and agreed that the liability of the Surety for any and all defaults of the Principal hereunder shall be the full penal sum of this Bond. The Surety, for value received, hereby stipulates and agrees that obligations of the Surety under this Bond shall be for a term of sixty (60) days from actual date of the bid opening.

PROVIDED, HOWEVER, that this Bond is executed pursuant to provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their several seals on the date indicated below, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

DATED this _____ day of _____, 20_____ .

Principal's name and address (if other than a corporation):

_____

_____

By: _____

Title: _____

Principal's name and address (if a corporation):

_____

_____

By: _____

Title: _____

(Affix Corporate Seal)

Surety's name and address:

_____

_____

STATE OF _____)
) ss.
COUNTY OF _____)

By: _____
Attorney-in-Fact (Affix Corporate Seal)

On this ____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.
My Commission Expires: _____
Resides at: _____

_____
NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

INSTRUCTIONS AND SUBCONTRACTORS LIST FORM

The three low bidders, as well as all other bidders that desire to be considered, are required by law to submit to DFCM within 24 hours of bid opening a list of **ALL** first-tier subcontractors, including the subcontractor's name, bid amount and other information required by Building Board Rule and as stated in these Contract Documents, on the following basis:

PROJECTS UNDER $500,000 - ALL SUBS $20,000 OR OVER MUST BE LISTED
PROJECTS $500,000 OR MORE - ALL SUBS $35,000 OR OVER MUST BE LISTED

- Any additional subcontractors identified in the bid documents shall also be listed.
- The DFCM Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law.
- List subcontractors for base bid as well as the impact on the list that the selection of any alternate may have.
- Bidder may not list more than one subcontractor to perform the same work.
- Bidder must list "Self" if performing work itself.

LICENSURE:

The subcontractor's name, the type of work, the subcontractor's bid amount, and the subcontractor's license number as issued by DOPL, if such license is required under Utah Law, shall be listed. Bidder shall certify that all subcontractors, required to be licensed, are licensed as required by State law. A subcontractor includes a trade contractor or specialty contractor and does not include suppliers who provide only materials, equipment, or supplies to a contractor or subcontractor.

BIDDER LISTING 'SELF' AS PERFORMING THE WORK:

Any bidder that is properly licensed for the particular work and intends to perform that work itself in lieu of a subcontractor that would otherwise be required to be on the subcontractor list, must insert the term 'Self' for that category on the subcontractor list form. Any listing of 'Self' on the sublist form shall also include the amount allocated for that work.

'SPECIAL EXCEPTION':

A bidder may list 'Special Exception' in place of a subcontractor when the bidder intends to obtain a subcontractor to perform the work at a later date because the bidder was unable to obtain a qualified or reasonable bid under the provisions of U.C.A.Section 63A-5-208(4). The bidder shall insert the term 'Special Exception' for that category of work, and shall provide documentation with the subcontractor list describing the bidder's efforts to obtain a bid of a qualified subcontractor at a reasonable cost and why the bidder was unable to obtain a qualified subcontractor bid. The Director must find that the bidder complied in good faith with State law requirements for any 'Special Exception' designation, in order for the bid to be considered. If awarded the contract, the Director shall supervise the bidder's efforts to obtain a qualified subcontractor bid. The amount of the awarded contract may not be adjusted to reflect the actual amount of the subcontractor's bid. Any listing of 'Special Exception' on the sublist form shall also include amount allocated for that work.

GROUNDS FOR DISQUALIFICATION:

The Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law. Director may withhold awarding the contract to a particular bidder if one or more of the proposed subcontractors are considered by the Director to be unqualified to do the Work or for such other reason in the best interest of the State of Utah. Notwithstanding any other provision in these instructions, if there is a good faith error on the sublist form, at the sole discretion of the Director, the Director may provide notice to the contractor and the contractor shall have 24 hours to submit the correction to the Director. If such correction is submitted timely, then the sublist requirements shall be considered met.

CHANGES OF SUBCONTRACTORS SPECIFICALLY IDENTIFIED ON SUBLIST FORM:

Subsequent to twenty-four hours after the bid opening, the contractor may change its listed subcontractors only after receiving written permission from the Director based on complying with all of the following criteria.

(1) The contractor has established in writing that the change is in the best interest of the State and that the contractor establishes an appropriate reason for the change, which may include, but not is not limited to, the following reasons: the original subcontractor has failed to perform, or is not qualified or capable of performing, and/or the subcontractor has requested in writing to be released.
(2) The circumstances related to the request for the change do not indicate any bad faith in the original listing of the subcontractors.
(3) Any requirement set forth by the Director to ensure that the process used to select a new subcontractor does not give rise to bid shopping.
(4) Any increase in the cost of the subject subcontractor work is borne by the contractor.
(5) Any decrease in the cost of the subject subcontractor work shall result in a deductive change order being issued for the contract for such decreased amount.
(6) The Director will give substantial weight to whether the subcontractor has consented in writing to being removed unless the Contractor establishes that the subcontractor is not qualified for the work.

EXAMPLE:

Example of a list where there are only four subcontractors:

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #
ELECTRICAL	ABCD Electric Inc.	$350,000.00	123456789000
LANDSCAPING	"Self"	300,000.00	123456789000
CONCRETE (ALTERNATE #1)	XYZ Concrete Inc	298,000.00	987654321000
MECHANICAL	"Special Exception" (attach documentation)	Fixed at: 350,000.00	(TO BE PROVIDED AFTER OBTAINING SUBCONTRACTOR)

PURSUANT TO STATE LAW - SUBCONTRACTOR BID AMOUNTS CONTAINED IN THIS SUBCONTRACTOR LIST SHALL NOT BE DISCLOSED UNTIL THE CONTRACT HAS BEEN AWARDED.

SUBCONTRACTORS LIST

FAX TO 801-538-3677

PROJECT TITLE: _____

Caution: You must read and comply fully with instructions.

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #

We certify that:

1. This list includes all subcontractors as required by the instructions, including those related to the base bid as well as any alternates.
2. We have listed "Self" or "Special Exception" in accordance with the instructions.
3. All subcontractors are appropriately licensed as required by State law.

FIRM: _____

DATE: _____ SIGNED BY: _____

NOTICE: FAILURE TO SUBMIT THIS FORM, PROPERLY COMPLETED AND SIGNED, AS REQUIRED IN THESE CONTRACT DOCUMENTS, SHALL BE GROUNDS FOR DFCMS REFUSAL TO ENTER INTO A WRITTEN CONTRACT WITH BIDDER. ACTION MAY BE TAKEN AGAINST BIDDERS BID BOND AS DEEMED APPROPRIATE BY DFCM. ATTACH A SECOND PAGE IF NECESSARY.

FUGITIVE DUST PLAN

The Contractor will fill out the form and file the original with the Division of Air Quality and a copy of the form with the Division of Facilities Construction & Management, prior to the issuance of any notice to proceed.

The Contractor will be fully responsible for compliance with the Fugitive Dust Control Plan, including the adequacy of the plan, any damages, fines, liability, and penalty or other action that results from noncompliance.

Utah Division of Air Quality
April 20, 1999

GUIDANCE THAT MUST BE CONSIDERED IN DEVELOPING AND SUBMITTING A DUST CONTROL PLAN FOR COMPLIANCE WITH R307-309-3, 4, 5, 6, 7

Source Information:

1. Name of your operation (source): provide a name if the source is a construction site.

2. Address or location of your operation or construction site.

3. UTM coordinates or Longitude/Latitude of stationary emission points at your operation.

4. Lengths of the project, if temporary (time period).

5. Description of process (include all sources of dust and fugitive dust). Please, if necessary, use additional sheets of paper for this description. Be sure to mark it as an attachment.

6. Type of material processed or disturbed.

7. Amount of material processed (tons per year, tons per month, lbs./hr., and applicable units).

8. Destination of product (where will the material produced be used or transported, be specific, provide address or specific location), information needed for temporary relocation applicants.

9. Identify the individual who is responsible for the implementation and maintenance of fugitive dust control measures. List name(s), position(s) and telephone number(s).

10. List, and attach copies of any contract lease, liability agreement with other companies that may, or will, be responsible for dust control on site or on the project.

Description of Fugitive Dust Emission Activities
(Things to consider in addressing fugitive dust control strategies.)

1. Type of activities (drilling and blasting, road construction, development construction, earth moving and excavation, handling and hauling materials, cleaning and leveling, etc).

2. List type of equipment generating the fugitive dust.

3. Diagram the location of each activity or piece of equipment on site. Please attach the diagram.

4. Provide pictures or drawings of each activity. Include a drawing of the unpaved/paved road network used to move loads "on" and "off" property.

5. Vehicle miles travels on unpaved roads associated with the activity (average speed).

6. Type of dust emitted at each source (coal, cement, sand, soil, clay, dust, etc.)

7. Estimate the size of the release area at which the activity occurs (square miles). For haul or dirt roads include total miles of road in use during the activity.

Description of Fugitive Dust Emission Controls on Site

Control strategies must be designed to meet 20% opacity or less on site (a lesser opacity may be defined by Approval Order conditions or federal requirements such as NSPS), and control strategies must prevent exceeding 10% opacity from fugitive dust at the property boundary (site boundary) for compliance with R307-309-3.

1. Types of ongoing emission controls proposed for each activity, each piece of equipment, and haul roads.

2. Types of additional dust controls proposed for bare, exposed surfaces (chemical stabilization, synthetic cover, wind breaks, vegetative cover, etc).

3. Method of application of dust suppressant.

4. Frequency of application of dust suppressant.

5. Explain what triggers the use of a special control measure other than routine measures already in place, such as covered loads or measures covered by a permit condition (increase in opacity, high winds, citizen complaints, dry conditions, etc).

6. Explain in detail what control strategies/measures will be implemented off-hours, i.e., Saturdays/Sundays/Holidays, as well as 6 PM to 6 AM each day.

Description of Fugitive Dust Control Off-site

Prevent, to the maximum extent possible, deposition of materials, which may create fugitive dust on public and private paved roads in compliance with R307-309-5, 6, 7.

1. Types of emission controls initiated by your operation that are in place "off" property (application of water, covered loads, sweeping roads, vehicle cleaning, etc.).

2. Proposed remedial controls that will be initiated promptly if materials, which may create fugitive dust, are deposited on public and private paved roads.

Submit the Dust Control Plan to:

Executive Secretary
Utah Air Quality Board
POB 144820
15 North 1950 West
Salt Lake City, Utah 84114-4820

Phone: (801) 536-4000
FAX: (801) 536-4099

Fugitive Dust Control Plan Violation Report

When a source is found in violation of R307-309-3 or in violation of the Fugitive Dust Control Plan, the course must submit a report to the Executive Secretary within 15 days after receiving a Notice of Violation. The report must include the following information:

1. Name and address of dust source.

2. Time and duration of dust episode.

3. Meteorological conditions during the dust episode.

4. Total number and type of fugitive dust activities and dust producing equipment within each operation boundary. If no change has occurred from the existing dust control plan, the source should state that the activity/equipment is the same.

5. Fugitive dust activities or dust producing equipment that caused a violation of R-307-309-3 or the sources dust control plan.

6. Reasons for failing to control dust from the dust generating activity or equipment.

7. New and/or additional fugitive dust control strategies necessary to achieve compliance with R307-309-3, 4, 5, 6, or 7.

8. If it can not be demonstrated that the current approved Dust Control Plan can result in compliance with R307-309-3 through 7, the Dust Control Plan must be revised so as to demonstrate compliance with 307-309-3 through 7. Within 30 days of receiving a fugitive dust Notice of Violation, the source must submit the revised Plan to the Executive Secretary for review and approval.

Submit the Dust Control Plan to:

Executive Secretary
Utah Air Quality Board
POB 144820
15 North 1950 West
Salt Lake City, Utah 84114-4820

Phone: (801) 536-4000
FAX: (801) 536-4099

Attachments: DFCM Form FDR R-307-309, Rule 307-309

CONTRACTOR'S AGREEMENT

FOR:

_____
_____
_____

THIS CONTRACTOR'S AGREEMENT, made and entered into this ____ day of _____, 20__, by and between the DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT, hereinafter referred to as "DFCM", and _____, incorporated in the State of _____ and authorized to do business in the State of Utah, hereinafter referred to as "Contractor", whose address is _____.

WITNESSETH: WHEREAS, DFCM intends to have Work performed at _____ _____.

WHEREAS, Contractor agrees to perform the Work for the sum stated herein.

NOW, THEREFORE, DFCM and Contractor for the consideration provided in this Contractor's Agreement, agree as follows:

ARTICLE 1. SCOPE OF WORK. The Work to be performed shall be in accordance with the Contract Documents prepared by _____ and entitled "_____."

The DFCM General Conditions ("General Conditions") dated May 25, 2005 on file at the office of DFCM and available on the DFCM website, are hereby incorporated by reference as part of this Agreement and are included in the specifications for this Project. All terms used in this Contractor's Agreement shall be as defined in the Contract Documents, and in particular, the General Conditions.

The Contractor Agrees to furnish labor, materials and equipment to complete the Work as required in the Contract Documents which are hereby incorporated by reference. It is understood and agreed by the parties hereto that all Work shall be performed as required in the Contract Documents and shall be subject to inspection and approval of DFCM or its authorized representative. The relationship of the Contractor to the DFCM hereunder is that of an independent Contractor.

ARTICLE 2. CONTRACT SUM. The DFCM agrees to pay and the Contractor agrees to accept in full performance of this Contractor's Agreement, the sum of _____ _____ DOLLARS AND NO CENTS ($_____.00), which is the base bid, and which sum also includes the cost of a 100% Performance Bond and a 100%

Payment Bond as well as all insurance requirements of the Contractor. Said bonds have already been posted by the Contractor pursuant to State law. The required proof of insurance certificates have been delivered to DFCM in accordance with the General Conditions before the execution of this Contractor's Agreement.

ARTICLE 3. TIME OF COMPLETION AND DELAY REMEDY. The Work shall be Substantially Complete within _____ (___) calendar days after the date of the Notice to Proceed. Contractor agrees to pay liquidated damages in the amount of $_____ per day for each day after expiration of the Contract Time until the Contractor achieves Substantial Completion in accordance with the Contract Documents, if Contractor's delay makes the damages applicable. The provision for liquidated damages is: (a) to compensate the DFCM for delay only; (b) is provided for herein because actual damages can not be readily ascertained at the time of execution of this Contractor's Agreement; (c) is not a penalty; and (d) shall not prevent the DFCM from maintaining Claims for other non-delay damages, such as costs to complete or remedy defective Work.

No action shall be maintained by the Contractor, including its or Subcontractor or suppliers at any tier, against the DFCM or State of Utah for damages or other claims due to losses attributable to hindrances or delays from any cause whatsoever, including acts and omissions of the DFCM or its officers, employees or agents, except as expressly provided in the General Conditions. The Contractor may receive a written extension of time, signed by the DFCM, in which to complete the Work under this Contractor's Agreement in accordance with the General Conditions.

ARTICLE 4. CONTRACT DOCUMENTS. The Contract Documents consist of this Contractor's Agreement, the Conditions of the Contract (DFCM General Conditions, Supplementary and other Conditions), the Drawings, Specifications, Addenda and Modifications. The Contract Documents shall also include the bidding documents, including the Notice to Contractors, Instructions to Bidders/ Proposers and the Bid/Proposal, to the extent not in conflict therewith and other documents and oral presentations that are documented as an attachment to the contract.

All such documents are hereby incorporated by reference herein. Any reference in this Contractor's Agreement to certain provisions of the Contract Documents shall in no way be construed as to lessen the importance or applicability of any other provisions of the Contract Documents.

ARTICLE 5. PAYMENT. The DFCM agrees to pay the Contractor from time to time as the Work progresses, but not more than once each month after the date of Notice to Proceed, and only upon Certificate of the A/E for Work performed during the preceding calendar month, ninety-five percent (95%) of the value of the labor performed and ninety-five percent (95%) of the value of materials furnished in place or on the site. The Contractor agrees to furnish to the DFCM invoices for materials purchased and on the site but not installed, for which the Contractor requests payment and agrees to

safeguard and protect such equipment or materials and is responsible for safekeeping thereof and if such be stolen, lost or destroyed, to replace same.

Such evidence of labor performed and materials furnished as the DFCM may reasonably require shall be supplied by the Contractor at the time of request for Certificate of Payment on account. Materials for which payment has been made cannot be removed from the job site without DFCM's written approval. Five percent (5%) of the earned amount shall be retained from each monthly payment. The retainage, including any additional retainage imposed and the release of any retainage, shall be in accordance with UCA 13-8-5 as amended. Contractor shall also comply with the requirements of UCA 13-8-5, including restrictions of retainage regarding subcontractors and the distribution of interest earned on the retention proceeds. The DFCM shall not be responsible for enforcing the Contractor's obligations under State law in fulfilling the retention law requirements with subcontractors at any tier.

ARTICLE 6. INDEBTEDNESS. Before final payment is made, the Contractor must submit evidence satisfactory to the DFCM that all payrolls, materials bills, subcontracts at any tier and outstanding indebtedness in connection with the Work have been properly paid. Final Payment will be made after receipt of said evidence, final acceptance of the Work by the DFCM as well as compliance with the applicable provisions of the General Conditions.

Contractor shall respond immediately to any inquiry in writing by DFCM as to any concern of financial responsibility and DFCM reserves the right to request any waivers, releases or bonds from Contractor in regard to any rights of Subcontractors (including suppliers) at any tier or any third parties prior to any payment by DFCM to Contractor.

ARTICLE 7. ADDITIONAL WORK. It is understood and agreed by the parties hereto that no money will be paid to the Contractor for additional labor or materials furnished unless a new contract in writing or a Modification hereof in accordance with the General Conditions and the Contract Documents for such additional labor or materials has been executed. The DFCM specifically reserves the right to modify or amend this Contractor's Agreement and the total sum due hereunder either by enlarging or restricting the scope of the Work.

ARTICLE 8. INSPECTIONS. The Work shall be inspected for acceptance in accordance with the General Conditions.

ARTICLE 9. DISPUTES. Any dispute, PRE or Claim between the parties shall be subject to the provisions of Article 7 of the General Conditions. DFCM reserves all rights to pursue its rights and remedies as provided in the General Conditions.

ARTICLE 10. TERMINATION, SUSPENSION OR ABANDONMENT. This Contractor's Agreement may be terminated, suspended or abandoned in accordance with the General Conditions.

ARTICLE 11. DFCM'S RIGHT TO WITHHOLD CERTAIN AMOUNT AND MAKE USE THEREOF. The DFCM may withhold from payment to the Contractor such amount as, in DFCM's judgment, may be necessary to pay just claims against the Contractor or Subcontractor at any tier for labor and services rendered and materials furnished in and about the Work. The DFCM may apply such withheld amounts for the payment of such claims in DFCM's discretion. In so doing, the DFCM shall be deemed the agent of Contractor and payment so made by the DFCM shall be considered as payment made under this Contractor's Agreement by the DFCM to the Contractor. DFCM shall not be liable to the Contractor for any such payment made in good faith. Such withholdings and payments may be made without prior approval of the Contractor and may be also be prior to any determination as a result of any dispute, PRE, Claim or litigation.

ARTICLE 12. INDEMNIFICATION. The Contractor shall comply with the indemnification provisions of the General Conditions.

ARTICLE 13. SUCCESSORS AND ASSIGNMENT OF CONTRACT. The DFCM and Contractor, respectively bind themselves, their partners, successors, assigns and legal representatives to the other party to this Agreement, and to partners, successors, assigns and legal representatives of such other party with respect to all covenants, provisions, rights and responsibilities of this Contractor's Agreement. The Contractor shall not assign this Contractor's Agreement without the prior written consent of the DFCM, nor shall the Contractor assign any moneys due or to become due as well as any rights under this Contractor's Agreement, without prior written consent of the DFCM.

ARTICLE 14. RELATIONSHIP OF THE PARTIES. The Contractor accepts the relationship of trust and confidence established by this Contractor's Agreement and covenants with the DFCM to cooperate with the DFCM and A/E and use the Contractor's best skill, efforts and judgment in furthering the interest of the DFCM; to furnish efficient business administration and supervision; to make best efforts to furnish at all times an adequate supply of workers and materials; and to perform the Work in the best and most expeditious and economic manner consistent with the interests of the DFCM.

ARTICLE 15. AUTHORITY TO EXECUTE AND PERFORM AGREEMENT. Contractor and DFCM each represent that the execution of this Contractor's Agreement and the performance thereunder is within their respective duly authorized powers.

ARTICLE 16. ATTORNEY FEES AND COSTS. Except as otherwise provided in the dispute resolution provisions of the General Conditions, the prevailing party shall be entitled to reasonable attorney fees and costs incurred in any action in the District Court and/or appellate body to enforce this Contractor's Agreement or recover damages or any other action as a result of a breach thereof.

IN WITNESS WHEREOF, the parties hereto have executed this Contractor's Agreement on the day and year stated hereinabove.

CONTRACTOR: _____

_____
Signature Date

Title: _____

State of _____)
)
County of _____) _____
Please type/print name clearly

On this ____ day of _____, 20____, personally appeared before me, _____, whose identity is personally known to me (or proved to me on the basis of satisfactory evidence) and who by me duly sworn (or affirmed), did say that he (she) is the _____ (title or office) of the firm and that said document was signed by him (her) in behalf of said firm.

_____
Notary Public

(SEAL)

My Commission Expires _____

APPROVED AS TO AVAILABILITY OF FUNDS:

_____
Financial Manager, Date
Division of Facilities Construction and Management

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

_____
_____ Date
Manager -
Capital _____

APPROVED AS TO FORM:
ATTORNEY GENERAL
May 25, 2005
By: Alan S. Bachman
Asst Attorney General

APPROVED FOR EXPENDITURE:

_____
Division of Finance Date

PERFORMANCE BOND

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

That _____ hereinafter referred to as the "Principal" and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah, hereinafter referred to as the "Obligee, " in the amount of _____ _____ DOLLARS ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____, for the approximate sum of _____ _____ Dollars ($_____), which Contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall faithfully perform the Contract in accordance with the Contract Documents including, but not limited to, the Plans, Specifications and conditions thereof, the one year performance warranty, and the terms of the Contract as said Contract may be subject to Modifications or changes, then this obligation shall be void; otherwise it shall remain in full force and effect.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the state named herein or the heirs, executors, administrators or successors of the Owner.

The parties agree that the dispute provisions provided in the Contract Documents apply and shall constitute the sole dispute procedures of the parties.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the Provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20_____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____

(Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)

) ss.

COUNTY OF _____)

On this _____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney in-fact of the above-named Surety Company and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____

Resides at: _____

_____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

DFCM FORM 1b 052505

PAYMENT BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____ _____, a corporation organized and existing under the laws of the State of _____authorized to do business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); with its principal office in the City of _____, hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah hereinafter referred to as the "Obligee," in the amount of _____ Dollars ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____ for the approximate sum of _____ _____ Dollars ($_____), which contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall pay all claimants supplying labor or materials to Principal or Principal's Subcontractors in compliance with the provisions of Title 63, Chapter 56, of Utah Code Annotated, l953, as amended, and in the prosecution of the Work provided for in said Contract, then, this obligation shall be void; otherwise it shall remain in full force and effect.

That said Surety to this Bond, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the Contract or to the Work to be performed thereunder, or the specifications or drawings accompanying same shall in any way affect its obligation on this Bond, and does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to the Work or to the specifications or drawings and agrees that they shall become part of the Contract Documents.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____

(Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20____, personally appeared before me _____ _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____

Resides at: _____

_____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

DFCM FORM 1b 052505

CHANGE ORDER #_____

CONTRACTOR:

ARCHITECT:

AGENCY OR INSTITUTION:
PROJECT NAME:
PROJECT NUMBER:
CONTRACT NUMBER:
DATE:

CONSTRUCTION CHANGE DIRECTIVE NO.	PROPOSAL REQUEST NO.	AMOUNT		DAYS	
		INCREASE	DECREASE	INCREASE	DECREASE

	Amount	Days	Date
ORIGINAL CONTRACT			
TOTAL PREVIOUS CHANGE ORDERS			
TOTAL THIS CHANGE ORDER			
ADJUSTED CONTRACT			

DFCM and Contractor agree that the terms, contract sum, scope of the Work and time specified in this Change Order shall constitute the full accord and satisfaction, and complete adjustment to the Contract and includes all direct and indirect costs and effects related to, incidental to, and/or reasonably implied from such change in the contract terms, sum, scope of the Work and time.

Contractor:_____
Date

Architect/Engineer:_____
Date

Agency or Institution:_____
Date

DFCM: _____
Date

Funding Verification:_____
Date

CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT _____ PROJECT NO: _____
AGENCY/INSTITUTION _____

AREA ACCEPTED _____

The Work performed under the subject Contract has been reviewed on this date and found to be Substantially Completed as defined in the General Conditions; including that the construction is sufficiently completed in accordance with the Contract Documents, as modified by any change orders agreed to by the parties, so that the State of Utah can occupy the Project or specified area of the Project for the use for which it is intended.

The DFCM - (Owner) accepts the Project or specified area of the Project as Substantially Complete and will assume full possession of the Project or specified area of the Project at _____ (time) on _____ (date).

The DFCM accepts the Project for occupancy and agrees to assume full responsibility for maintenance and operation, including utilities and insurance, of the Project subject to the itemized responsibilities and/or exceptions noted below:

_____

_____

The Owner acknowledges receipt of the following closeout and transition materials:

☐ As-built Drawings ☐ O & M Manuals ☐ Warranty Documents ☐ Completion of Training Requirements

A list of items to be completed or corrected (Punch List) is attached hereto. The failure to include an item on it does not alter the responsibility of the Contractor to complete all the Work in accordance with the Contract Documents, including authorized changes thereof. The amount of _____(Twice the value of the punch list work) shall be retained to assure the completion of the punch list work.

The Contractor shall complete or correct the Work on the list of (Punch List) items appended hereto within _____ _____calendar days from the above date of issuance of this Certificate. The amount withheld pending completion of the list of items noted and agreed to shall be: $_____. If the list of items is not completed within the time allotted the Owner has the right to be compensated for the delays and/or complete the work with the help of independent contractor at the expense of the retained project funds. If the retained project funds are insufficient to cover the delay/completion damages, the Owner shall be promptly reimbursed for the balance of the funds needed to compensate the Owner.

_____	by:	_____	
CONTRACTOR (include name of firm)		(Signature)	DATE
_____	by:	_____	
A/E (include name of firm)		(Signature)	DATE
_____	by:	_____	
USING INSTITUTION OR AGENCY		(Signature)	DATE
_____	by:	_____	
DFCM (Owner)		(Signature)	DATE

4110 State Office Building, Salt Lake City, Utah 84114 cc: Parties Noted
telephone 801-538-3018 • facsimile 801-538-3267 • http://dfcm.utah.gov DFCM, Director

CONSTRUCTION SPECIFICATION

SPECIAL CONDITIONS

1. SCOPE

This section of the specifications cover specific requirements, instructions and conditions applicable to this project only, which are not covered by the General Conditions or detailed specifications. Should there be conflicting statements between this section and other sections of these specifications, this section shall govern.

2. STANDARD PRODUCTS

The material brand names and catalog numbers shown on the drawings or called out in the specifications are meant to set a standard that all other materials should meet. The Contractor or supplier will submit information and data to show his material is equal. The decision of the Engineer shall be final in this section.

3. CONTRACTOR TO MAINTAIN AND REPLACE STAKES

The Contractor shall furnish without charge, competent men from his force, stakes, tools and other materials, for the proper staking out of the work, in making measurements and surveys, and in establishing temporary or permanent reference marks in connection with the work. This does not mean to imply, the Contractor is to pay for initial staking, as this will be the cost of the Owner.

Initial staking to be provided by the Owner will be the establishment of:

a. Bench Marks.

b. Original lines and grades necessary for horizontal and vertical control of the construction of the permanent works.

c. Right-of-way limits acquired through permits from Federal Agencies.

The Contractor shall provide surveys necessary to maintain the lines and grades during the construction of the permanent works.

4. LINES AND GRADES

All work done under this contract shall be done to the line, grades, and elevations shown on the plans, or as directed by the Engineer. The Contractor shall keep the Engineer informed, a reasonable time in advance, of the times and places at which he intends to do work, in order that lines and grades may be furnished and necessary measurements for record and payment may be made with the minimum of inconvenience to the Engineer and delay to the

Contractor.

5. **PAYMENT OF SUPPLIES AND SUBCONTRACTORS**

It is intended that the Contractor and subcontractor make full monthly payments to their suppliers and subcontractors as invoices are rendered. Such invoices shall be deemed as paid at the time each monthly certificate of payment is prepared by the Engineer. Affidavits will be submitted by the Contractor each as means of certifying to the Engineer that all equipment and materials delivered has been paid for. This will be the normal proof of payment; however, the Engineer will have the right at any time to demand copies of certified paid invoices. Failure or inability to provide such paid invoices will be sufficient cause for hold-up for further monthly pay estimates.

6. **GENERAL SAFETY REQUIREMENTS**

Excavations

a. This section shall apply to all excavations in which workmen may be exposed to hazard of collapse of the banks, sides, or walls, during the time construction work is in process.

b. All excavations shall be guarded by shoring, bracing or underpinning, or other methods as may be necessary to prevent injury to workmen resulting from the sides caving in.

c. Excavated or other material must be deposited a safe distance from the edge of the excavation so as to prevent its falling or sliding back into the excavation.

d. No trenches shall be left open at any time unless guarded with adequate barricades, warning lamps, and signs.

e. Contractor's foremen and superintendents shall know where to obtain an oxygen resuscitator for use in an emergency. The phone number to call for immediate resuscitator and ambulance service shall be posted in all Contractors trench and at conspicuous places on the project at all times.

7. **CERTIFICATIONS**

Certifications that all materials used in the construction of the permanent works meet these specifications will be required. These certifications shall include the contract number, project name, bid item number, material furnished, applicable specification number and quantity furnished.

8. **TEST**

Test results that are required from the Contractor at the Contractor's expense will be performed as specified in the specifications. Duplicate copies of the test results shall be furnished to the Engineer for his approval at least 10 days prior to the use of the materials in the permanent works. All "on site" testing shall be made in the presence of and be approved by the Engineer or his representative. Written test results for "on site" tests will not be required.

9. LIQUIDATED DAMAGES

If the work, or any part thereof, is not completed within the time agreed upon in this contract or any extension thereof, the contractor shall be liable to the owner in the amount of $500.00 per day for each and every calendar day the completion of the work is delayed beyond the time provided in this contract, as fixed and agreed liquidated damages and not as a penalty, and the Owner shall have the right to deduct from the retainage of the moneys which may be then due or which may be due and payable to the Contractor, the amount of the liquidated damages; and if the amount so retained by the owner is insufficient to pay in full such liquidated damages, the Contractor shall pay to the Owner the amount necessary to effect payment in full of such liquidated damages.

10. EXISTING UTILITIES

The Contractor will be responsible for crossing existing utilities such as water lines, telephone lines, irrigation crossings, etc., with the construction equipment. If the utility or service lateral is damaged by the Contractor's negligence, it shall be restored at the Contractor's expense.

11. EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND SITES

The bidder is required to examine carefully the site of the proposed work, the proposal, plans, specifications, supplemental specification, special provision, and contract forms before submitting a proposal.

The submission of a bid shall be considered PRIMA FACIE evidence that the Bidder has made the required examinations and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the contract.

12. IMPROVEMENT RESTORATION

All improvements damaged, whether private or public, as a result of Contractor's work shall

be replaced by the Contractor. Improvement restoration shall be completed immediately upon completion of work in that area.

13. **WORK**

The Contractor shall not schedule work Saturdays, Sundays or holidays without written approval from the Engineer.

14. **AVAILABILITY OF MEN AND EQUIPMENT**

The Contractor shall have men and equipment available on weekends and holidays to cope with emergency conditions which may arise as a result of his operations. Phone numbers or addresses shall be provided in writing to the Owner.

15. **DUST CONTROL**

The Contractor will be required to provide dust control through the use of water trucks during operations.

16. **WASTE**

The Contractor will be required to dispose of all material from the site at an approved disposal area at no extra cost to the Owner.

17. **SUPERVISION BY CONTRACTOR**

The Contractor will supervise and direct work. He will be solely responsible for the means, techniques, sequences and procedures of construction. The Contractor will employ and maintain on the work site a qualified supervisor or superintendent who shall have been designated in writing by the Contractor as the contractors representative at the site. The supervisor or superintendent shall have full authority to act on behalf of the contractor and all communications given to the supervisor shall be as binding as if given to the contractor. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the work.

18. **CONTRACTOR'S PERSONNEL**

All work under this contract shall be performed in a skillful and workmanlike manner. The Owner may, in writing, require the Contractor to remove from the work any employee the Owner deems incompetent, careless, or otherwise objectionable.

19. **GUARANTEE OF THE WORK**

The Contractor shall, for a period of one (1) year after completion and acceptance of the work, maintain and repair any defective work which may occur to the permanent work.

20. **PRIVATE AND PUBLIC UTILITIES (BLUE STAKES)**

The Contractor shall notify all utility companies 48 hours prior to excavating to ensure as nearly uninterrupted service as is reasonably proper. The Contractor shall not claim extra compensation or time extensions due to delays resulting from utilities.

21. **RETAINAGE ON PROGRESS PAYMENTS**

Five percent (5%) will be retained on each progress payment to the Contractor until final completion and acceptance of all work.

22. **LIABILITY INSURANCE**

Before the contract is executed the Contractor with the successful bid shall be required to furnish to Owner, a copy of the public liability and property damage insurance policy in an amount of no less than $2,000,000 each occurrence, which is to be in force and applicable to the project. In addition, the Contractor shall be required to furnish, at the same time a letter from agent for the company holding said policy, stating that he will inform Owner of any change in the status of the policy. Also, Workmen's Compensation Insurance shall be provided by the Contractor.

23. **COMPENSATION**

Compensation for conformance with the requirements of these 'Special Conditions' will be included in the appropriate Bid Item.

CONSTRUCTION SPECIFICATION

8. MOBILIZATION

1. SCOPE

The work shall consist of the mobilization of the Contractor's forces and equipment necessary for performing the work required under the contract.

It shall include the purchase of contract bonds, insurance, transportation of personnel, equipment, and operating supplies to the site; establishment of office, buildings, construction signing in accordance with the manual on "Uniform Traffic Control Device", and other necessary facilities at the site; and other preparatory work at the site.

It shall not include mobilization for any specific item of work for which payment for mobilization is provided elsewhere in the contract.

This specification covers mobilization of work required by the contract at the time of award. If additional mobilization costs are incurred during performance of the contract as a result of change or added items of work for which the Contractor is entitled to an adjustment in contract price, compensation for such costs will be included in the price adjustment for the items of work changed or added.

2. PAYMENT

Payment will be made as the work proceeds, after presentation of invoices by the contractor showing his own mobilizations costs and evidence of the charges of suppliers, subcontractors, and others for mobilization work performed by them. If the total of such payments is less than the contract lump sum for mobilization, the unpaid balance will be included in the final contract payment. Total payment will be the lump sum contract price for mobilization, regardless of actual cost to the Contractor.

Payment will not be made under this item for the purchase costs of materials having a residual value, the purchase costs of materials to be incorporated into the project, or the purchase costs of operating supplies.

Payment of the lump sum contract price for mobilization will constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to completion of the work.

Compensation for any item of work described in the contract but not listed on the bid schedule will be included in the payment for the item or work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 3 of this specification.

3. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 1 - Mobilization

1. This item shall consist of the contract bonds, construction signing, mobilization of the Contractor's forces, traffic control and equipment, as defined in Section 1, required for performing the work under this contract.

2. Compensation for providing and installing all traffic safety signing and construction warning signs required for work on State, County and City rights-of-way will be provided in this bid item.

4. Payment will be made in accordance with Section 2.

CONSTRUCTION SPECIFICATIONS

9. EXCAVATION AND BACKFILL FOR PIPELINES

1. SCOPE

This section covers the requirements for trenching and backfilling for underground pipelines.

2. CONTROL OF GROUND WATER

All trenches shall be kept free from water during excavation, fine grading, pipe laying, jointing, and embedment operations. Where the trench bottom is wet or otherwise unstable because of the presence of ground water, and in cases where the static ground water elevation is above the bottom of any trench or bell excavation, such ground water shall be lowered to the extent necessary to keep the trench free from water and the trench bottom stable when the work within the trench is in progress. Surface water shall be prevented from entering trenches. Discharge from trench dewatering pumps shall be conducted to natural drainage channels, or other approved site.

3. EXCAVATION FOR PIPELINES

The trench shall be excavated to the required alignment depth and width to accommodate the construction of the pipelines. Excavation shall be in conformance with all Federal, State and Local regulations for the safety and protection of the workmen.

a. When rock, stones, cobble rock, concrete, masonry or other unsatisfactory material is encountered in the excavation, it shall be removed to provide a clearance of at least 6 inches below and on each side of all pipe. When excavation is completed, a bedding of sand, screened stone, or earth that is free from stones, large clods, or frozen earth, shall be placed on the bottom of the trench to the required depths, leveled, and tamped.

   The specific clearances shall be maintained between the bottom of all pipe and appurtenances and any part, projection, or point of rock, boulder, or stones or sufficient size and placement which, in the opinion of the inspector, could cause a fulcrum point.

b. Where unstable earth is encountered in the excavation at the grade of the pipe, a minimum of six inches below grade will be removed and backfilled with crushed rock or gravel to provide a stable subgrade.

4. **BLASTING**

Blasting will not be allowed except by permission from the Engineer. The Contractor shall comply with all laws, ordinances, and applicable safety code requirements and regulations relative to the handling, storage, and use of explosives and protection of life and property, and he shall be fully responsible for all damage attributable to his blasting operations. Excessive blasting or overshooting will not be permitted and any material outside the authorized cross-section which may be shattered or loosened by blasting will be removed by the Contractor at no extra cost.

5. **SHEETING, BRACING & SHORING OF EXCAVATIONS**

Excavation shall be sheeted, braced, and shored as required to support the walls of the excavations to eliminate sliding and settling and as may be required to protect the workmen, the work in progress and existing utilities and improvements. All such sheeting, bracing and shoring shall comply with the requirements of the Utah State Industrial Commission.

All damage resulting from lack of adequate sheeting, bracing and shoring will be the responsibility of the Contractor. The Contractor shall effect all necessary repairs or reconstruction resulting from such damages.

6. **BEDDING**

The pipe shall be firmly and uniformly bedded through its entire length and to a depth of 6 inches above the pipe and in the manner as shown on the drawings. The bedding material shall be free of any rock larger than 1-inch. Material shall be worked around the haunches of the pipe to fill all voids and provide firm, uniform support. Wherever the subgrade material does not afford a sufficiently solid foundation to support the pipe and superimposed load and where water must be drained to maintain a dry bottom for pipe installation and at other locations as shown on the plans, the subgrade shall be excavated to the specified depth and replaced with gravel bedding.

It will be placed so as to prevent segregation and as shown on the drawings. The gravel bedding shall meet the following sieve requirements:

US Sieve Size or Number	% Passing
3”	100
1 ½”	95-100
¾”	35-70
3/8”	10-10

No.4 0-5

7. BACKFILLING

Backfilling shall be carefully placed around and over pipes and shall not be permitted to fall directly on a pipe from such a height or in such a manner as to cause damage. In these specifications, the process of preparing the trench bottom to receive the pipe and the backfilling on the pipe to a level 12 inches over the top of the pipe is defined as Bedding. Bedding requirements are as defined in the specifications for each specific pipe material.

Trench backfilling above the level of the pipe bedding shall normally be accomplished with native excavated materials and shall be free from rocks larger than six inches in diameter.

The backfill in all utility trenches shall be either compacted or water consolidated to the requirements specified for the materials being placed. Under pavements, or other surface improvements, the in-place density shall be a minimum of 95% percent of laboratory standard maximum dry density as determined by AASHTO T-180. In shoulders and other areas, the in-place density shall be a minimum of 90 percent of the maximum dry density as determined by the same test.

8. CONSOLIDATION OF BACKFILL

Consolidation of backfill shall be accomplished by those methods in which water is used as the essential agent to produce the desired condition of density and stability. Water shall be applied by jetting unless flooding is specifically authorized by the Engineer. Authorization by the Engineer to use any consolidation method does not relieve the Contractor of responsibility to meet the specified density requirements. Water for consolidation shall be furnished by the Contractor at his expense.

All precautions necessary shall be taken by the Contractor to prevent damage and movement (including floating) of the pipeline, structures and existing adjacent improvements and utilities. The allowance of the use of consolidation methods shall not be construed as guaranteeing or implying that the use of such methods will not result in damage to adjacent ground. The Contractor shall make his own determination in this regard, and shall assume all risks and liability for settlement of lateral movement of adjacent ground, or improvements, or utilities, either on the surface of the ground or underground.

9. COMPACTION OF BACKFILL

Backfill shall be compacted by means of pneumatic tire rollers, vibrating rollers, or other mechanical tampers of a size and type approved by the Engineer.

Where compaction methods are used, the material shall be placed at a moisture content such that after compaction the required relative densities will be produced; also the material shall be placed in lifts which, prior to the compaction, shall not exceed 9 inches.

Prior to compaction, each layer shall be evenly spread, moistened, and worked by disk harrowing or other means approved by the Engineer.

If the required relative density is not attained, test sections will be required to determine any adjustments in compacting equipment, thickness of layers, moisture content and compactive effort necessary to attain the specified minimum relative density.

Approval of equipment, thickness of layers, moisture content and compactive effort shall not be deemed to relieve the Contractor or the responsibility for attaining the specified minimum relative densities. The Contractor, in planning his work, shall allow sufficient time to perform the work connected with the test sections, and to permit the Engineer to make tests for relative densities.

All relative density tests shall be made by the Owner at no expense to the Contractor.

10. USE OF EXCAVATED MATERIALS

Method 1

To the extent they are needed, all suitable materials from the specified excavations shall be used in the construction of required permanent earth fill or rock fill. The suitability of materials for specific purposes will be determined by the Engineer. The Contractor shall not waste or otherwise dispose of suitable excavated materials.

Method 2

Suitable materials from the specified excavations may be used in the construction of required earth fill or rock fill. The suitability of materials for specific purposes will be determined by the Engineer.

11. RESTORATION OF FACILITIES AND REMOVAL OF EXCESS MATERIALS

All excess materials shall be hauled away from the construction site and disposed of by the Contractor.

Trees, shrubs, and fences, and all other property and surface structures shall be protected during construction unless their removal is shown in the plans and specifications or approved by the Engineer.
All properties that have been disturbed shall be restored as nearly as practical to their original condition. This includes pavement, road surface, concrete, sidewalks, curb and gutter, etc.

12. STRUCTURE AND TRENCHING EXCAVATION

Structure or trench excavations shall be completed to the specified elevations and to sufficient length and width to include allowance for forms, bracing and supports, as necessary, before any concrete or earthfill is placed or any piles are driven within the limits of the excavation.

13. BORROW EXCAVATION

When the quantities or suitable materials obtained from specified excavations are insufficient to construct the specified fills, additional materials shall be obtained from the designated borrow area. The extent and depth of borrow pits within the limits of the designated borrow areas will be as directed by the Engineer.

Borrow pits shall be excavated and finally dressed in a manner to eliminate steep or unstable side slopes or other hazardous or unsightly conditions.

14. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in accordance with these specifications and construction details are:

a. Subsidiary Bid Item

1. This specification is subsidiary to all bid items which required excavation and backfill for pipelines.

2. Compacted fill requirements called for on the drawings will be 95% of test procedure ASTM 1557, Method D. Moisture content shall be within 2% of optimum.

3. All trenches other than road or street crossings designed for flowable fill, will be compacted by using a sheeps foot roller mounted on a track backhoe.

4. No excavated material shall be stockpiled on public access or parking areas without proper signing and warning barricades.

5. Waste material will be disposed of at a site approved by the Owner.

6. Compensation for meeting this specification will be made part of the payment for Bid Items which require excavation and backfill.

CONSTRUCTION SPECIFICATIONS

10. HOT MIX ASPHALT (HMA)

1. SCOPE

The work shall consist of the construction of a surface course composed of mineral aggregate and bituminous binder, placed and compacted within the lines and grades shown on the plans.

2. MATERIALS

a. Asphaltic Cements: Viscosity grades of asphalt cement prepared from petroleum shall conform to the requirements of AASHTO Designation M-226.

b. Asphaltic Emulsions: Anionic emulsified asphalt shall conform to the requirements of AASHTO Designation M-140.

c. Mineral Aggregate: Mineral aggregate shall consist of crusher processed virgin aggregate material consisting of crushed stone, and gravel, conforming to the following requirements:

1. Course aggregate retained on the No. 4 sieve shall consist of clean, hard, tough, durable, and sound fragments, with not more than 3 percent by weight of flat, elongated, soft or disintegrated particles, and shall be free from vegetable matter or other deleterious substances.

2. That portion of the aggregate retained on the No. 4 sieve shall have not less than 50% of particles by weight with at least two mechanically fractured face, or clean angular face.

3. The aggregate shall have a percentage of wear not exceeding 50% for road mix and 40% for plant mix, when tested in accordance with AASHTO Designation T-96. The Contractor shall certify that the mineral aggregate used on the job shall meet this wear test prior to its placement in the surface course.

4. Fine aggregate passing the No. 4 sieve, may be either a natural or manufactured product. The aggregate shall be clean, hard-grained and moderately sharp, and shall contain not more than 2 percent by weight of vegetable matter or other deleterious substances.

5. That portion of the fine aggregate passing the No. 40 sieve shall be nonplastic when tested in accordance with AASHTO Designation T-90.

6. The weight of minus 200 mesh sieve material retained in the aggregate as determined by the difference in percent passing a No. 200 sieve by washing and dry sieving without washing shall not exceed 6 percent of the total sample weight.

7. The combined mineral aggregate plus any specified additives, when mixed with the specified bituminous binder in accordance with ASTM Designation D-1559, shall conform to the following requirements:

Marshall Stability.....1200-2500 lbs.
Flow (0.01 inch).....10-18
Voids content.....1.5% to 3.0%

The requirements specified in this subsection shall be used to determine the suitability of the aggregate sources.

8. The combined dry mineral aggregate shall be uniformly graded and of such size that it meets one of the following gradation bands:

½" Gradation

	Ideal Gradation of Passing Band	% Passing Gradation Band
½"	100	100
#4	70	60-80
#16	35	28-42
#50	17	11-23
#200	7	5-9

Any deviation from the above gradation Bands must be approved in writing by the Engineer.

9. Contractor will be required to supply the Engineer with a job mix formula based on the proceeding criteria. Job mix formula must be approved by the Engineer

3. CONSTRUCTION METHODS

a. Hot Mix Plant: The mineral aggregate and bituminous binder shall be mixed at a central mixing plant. The shortest mixing time consistent with satisfactory coating of the aggregate shall be used, as determined by the Engineer. The mineral aggregate shall be considered satisfactorily coated with bitumen when all of the particles passing the No. 4 sieve and 98 percent of the particles retained on the No.4 sieve are coated.

b. Spreading and Compaction: Place HMA of 3-inches or more, in total compacted thickness, in two equal courses. The mixture shall be spread and struck-off in such a manner that finished surface shall conform to the elevations, grades, and cross-sections shown on the drawings or as staked in the field.

After the mixture has been spread, the surface shall be longitudinally rolled, beginning at the outside edge or lower side and proceeding toward the high side. Each pass of one roller shall overlap the proceeding pass by at least one-half the width of the roller. The surface shall be rolled by 4 passes with a pneumatic or steel-wheel exerting a minimum pressure of 40 psi., or by an approved equal method. Rolling operations shall be conducted in such a manner that shoving or distortion will not develop beneath the roller.

c. Finishing: The surface shall be finished to a smooth, uniform line and grade with surface deviations not exceeding 3/8-inch in 10 feet. Determination of compliance with smoothness may be made with a straight edge, chalk-line, or profilograph at the option of the Engineer. Any irregularities shall be satisfactorily corrected at the expense of the Contractor.

d. Temperature Control: The minimum temperature of the HMA at the time of application shall be 250 degrees Fahrenheit.

e. Weather Limitations: HMA shall not be placed when weather conditions are unfavorable or when the air temperature in the shade is less than 50 degrees Fahrenheit.

f. Weight Devices: When the method of measurement is by weight, the Contractor shall provide weigh scales.

The scales shall be accurate to within 1 percent of the correct weight throughout the range of use. Before using the scales and as frequently thereafter as the Engineer determines necessary to insure accuracy, the Contractor shall have the scales checked, adjusted, and certified by a representative of the State agency. The Contractor shall maintain the scales to the required accuracy.

g. Sampling of Aggregate: The Contractor shall submit test results and a certification of compliance that states that the gradation of the aggregate meets the contract requirements. The Contractor shall equip crushing, screening, and mixing plants with sampling devices. The Contractor shall take additional samples of material for testing as directed by the Engineer. These samples may be required at any time to validate the certification furnished by the Contractor.

Provisions shall be made for accurate proportioning. Each compartment shall have an outlet feed that can be shut off completely when any bin becomes empty. The bins or aggregate feeding system shall be constructed so samples can be readily obtained.

Positive weight measurement of the combined cold feed shall be maintained to allow regulation of the feed gate and permit automatic correction for variations in load.

The bituminous pavers feed control shall be coupled with the total aggregate weight measurement device to automatically vary the bitumen feed rate and to maintain the required proportion. Means shall be provided for checking the quantity or rate of flow of bitumen into the mixing unit. Thermometers shall be fixed in the bitumen feed line at the charging valve of the mixer unit and at the discharge chute of the mixer unit. The Engineer may require replacement of any thermometer by an approved temperature-recording apparatus to allow better regulation of the material temperature.

A method shall be provided to automatically adjust the bituminous content in the mix for moisture variations in the cold feed.

h. Hauling Equipment: Trucks used for hauling HMA shall have tight, clean, smooth metal beds that have been thinly coated with a material to prevent the moisture from adhering to the beds. Truck beds shall be drained prior to loading. Each truck shall have a cover to protect the mixture from the weather. When necessary to insure that the mixture will be delivered at the specified temperature, truck beds shall be insulated and covers shall be securely fastened.

I. Bituminous Pavers: HMA pavers shall be self-contained, power-propelled units, provided with an adjustable activated-screed or strike-off assembly, heated if necessary, and capable of spreading and finishing courses of bituminous plant mix material in lane widths and thicknesses shown on the drawings. When shown on the drawings, pavers shall be equipped with a control system capable of automatically maintaining the proper screed elevation. The control system shall be automatically actuated from either a reference line or surface through a system of sensors that will maintain the

paver screed at a predetermined transverse slope and at the proper elevation to obtain the required surface.

The transverse slope control system shall be capable of being made inoperative so that the screed can be controlled by mechanisms that will independently control the elevation of each end of the screed from reference line or surfaces.

The controls shall be capable of working in conjunction with any of the following attachments:

1. Ski-type device of not less than 30 feet in length.

2. Taut stringline (wire) set to grade.

3. Short ski or shoe.

j. Compaction shall be performed with vibratory steel-wheel and steel-wheel with pneumatic-tire rollers.

Rolling shall begin at the sides and proceed longitudinally parallel to the road centerline, each trip overlapping one-half the roller width, gradually progressing to the center. When paving in echelons or abutting a previously placed land, the longitudinal joint shall be rolled first, then followed by the above rolling procedure. On superelevated curves the rolling shall begin at the low side and progress to the high side.

Along forms, curbs, header walls, and other places not accessible to the rollers, the mixture shall be thoroughly compacted with hot hand tampers, smoothing irons, or mechanical tampers.

k. Joints, trimming edges, and cleanup: Placing of the HMA shall be continuous. Rollers shall not pass over the unprotected end of a freshly laid mixture. Transverse joints shall be formed by cutting back into the previous run to expose the full depth of the course. Heat shall be applied to contact surfaces or transverse joints just before any additional mixture is placed against the previously rolled material.

4. FLUSH COAT

When required, the coat shall be placed on the completed surface course. The coat shall not be placed within 7 days after the surface course is laid. Prior to placing the coat, the existing surface shall be cleaned of all dirt, sand, dust, or other objectionable material.

The material shall be sprayed over the prepared surface by means of a pressure distributor.

5. ACCEPTANCE SAMPLING AND TESTING

a. The Engineer will perform the testing of HMA (gradation and bituminous content). Acceptance samples of the mixture will be taken after it has been placed on the finished surface and just prior to compaction. Samples will be selected on a random basis and taken as frequently as the Engineer elects.

b. When price adjustments are required, the Contractor, at his own expense, shall core samples from the pavement to determine the defective area. Samples size and locations will be designated by the Engineer. Samples shall be neatly cut with a core drill. Voids left by sampling shall be backfilled and compacted to the density of the surrounding material.

c. Acceptance and testing HMA (compaction). After the HMA has been placed and compacted, the pavement shall meet the following density requirements.

Percent of Relative Maximum Density From Job Mix Formula
93 min.

Testing will be taken as frequently and at such locations as the Engineer elects. Compaction testing will be done by the Engineer.

d. Acceptance sampling and testing of bituminous mixture (surface smoothness and thickness).

1. Surface. Acceptance testing will be performed on the top surface. The surface will be tested by the Engineer with a straightedge. The variation of the surface from the testing edge of the straightedge shall not deviate at any point more than 1/8-inch.

2. Thickness. The total compacted thickness of the mixture shall not vary more than 1/4-inch from the specified thickness. The compacted thickness shall not consistently be below nor consistently above the specified thickness.

The Engineer reserves the right to test areas which appear defective and require immediate correction.

6. Price Adjustments

1. Gradation and Asphalt Content – See Table A. The computation of the adjusted unit price will be based upon the minimum pay factor determined from Table A.

a. The Engineer may order the removal of the mix if the acceptance tests deviate from the job-mix formula for a particular sieve or sieves, if the material is more than the values shown under the 0.70 pay factor for HMA in Table A.
b. If the mean of the deviations of test results for the lot is greater than 0.80 pay factor, the pay factor is 0.50. This applies only if the ENGINEER does not order the removal of the material.
c. Whenever testing by the Engineer indicates price adjustments are required the Contractor will comply with Section 5b. The Engineer will determine the area requiring adjustment. This will be accomplished by additional testing as stated.

2. Density

a. Areas with deficient density will be subject to the following price reductions:

TABLE A	PAY FACTOR
AVERAGE DENSITY IN PERCENT	**ASPHALT CONCRETE**
93 or more	1.00
91 to 92.9	0.90
Less than 91	0.50

TABLE A
ACCEPTANCE SCHEDULE FOR GRADATION
(Percentage Points)

SIEVE SIZE	PAY FACTOR A.C.	DEVIATIONS OF THE IDEAL GRADATION ACCEPTANCE TESTS FROM THE JOB-MIX (PERCENTAGE POINTS)
Asphalt Content	1.00	0-0.61
	0.95	0.62-0.68
	0.90	0.69-0.75

	0.80	0.76-0.82
½ inch & larger	1.00	0-1
	0.95	1.0-2.0
	0.90	2.0-3.0
	0.80	3.0-4.0
	0.70	4.0-5.0
No. 4	1.00	0-10
	0.95	10-11.4
	0.90	11.5-11.9
	0.80	11.9-12.5
	0.70	12.5-13.0
No. 16	1.00	0-7.0
	0.95	7.0-7.3
	0.90	7.4-7.7
	0.80	7.8-8.1
	0.70	8.2-8.4
No. 50	1.00	0-6.0
	0.95	6.0-6.5
	0.90	6.6-6.8
	0.80	6.9-7.1
	0.70	7.2-7.5
No. 200	1.00	0-2.0
	0.95	2.0-2.9
	0.90	3.0-3.1
	0.80	3.2-3.3
	0.70	3.4-3.5

7. MEASUREMENT AND PAYMENT

a. The bituminous material and mineral aggregate shall be measured by the square foot.

b. When required the bituminous flush coat material shall be measured by the ton.

c. Payment for the bituminous material, mineral aggregate will be made at the contract unit price. Such payment will constitute full compensation for furnishing, mixing, spreading, the bituminous material and mineral aggregate,

compacting all other items necessary and incidental to the performance of the work.

8. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and construction details are:

a. Bid Item 2, Hot Mix Asphalt (HMA) (PG58-22) (½-inch Max.)

1. This item shall consist of furnishing the mineral aggregate, bituminous material, mixing the aggregate and bituminous material, spreading, and compacting the mixture as shown on the drawings.

2. Contractor will supply the Engineer with the mix calibration factor, and a set of calibration samples 7 days prior to placement of asphalt.

3. The aggregate shall meet the requirements as listed in Section 2 of these specifications.

4. The asphalt shall be grade PG58-22, viscosity graded.

5. The aggregates and the bituminous material shall be measured or gaged and introduced into the mixer in the amount specified by the job mix formula.

   After the required amounts of aggregate and bituminous material have been introduced into the mixer, the materials shall be mixed until a complete and uniform coating of particles and a thorough distribution of the bituminous material throughout the aggregate is obtained.

6. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture may be placed and finished by hand tools.

7. HMA shall be placed at a temperature not less than 250 degrees Fahrenheit.

8. Material trimmed from the edges and any other discarded bituminous mixture shall be removed from the project and disposed of by the Contractor in an approved area.

9. Contractor will be required to hand rake all seams.

10. Testing noted in Section 5.b will only apply when price adjustments are involved..

11. Asphalt shall be placed at the finished depth noted on the plans. Tack coat will be required on all asphalt edges.

12. Contractor will not stockpile hot HMA on existing asphalt roads prior to placement.

13. HMA will not be placed during rain, when the roadbed is wet or during other adverse weather conditions. The owner will not be responsible for any HMA that is on the project site, but unable to spread due to adverse weather.

14. Contractor will be required to deliver to the Engineer a weight invoice prior to placement of the asphalt surface course, invoices not received the day of placement will not be paid for.

15. Contractor will hand sweep and remove all sluffage on and against concrete just prior to HMA placement to assure a clean surface and proper depth.

16. Measurement and payment shall be in accordance with Section 7a and c for each type of HMA actually placed.

CONSTRUCTION SPECIFICATION

21. EXCAVATION

1. SCOPE

The work shall consist of the excavation required by determining the specification and disposal of the excavated materials.

2. CLASSIFICATION

Excavation will be classified its common excavation for rock excavation in accordance with the following definitions were will be designated as a classified.

Common excavation shall be defined as the excavation of all materials that can be excavated, transported, and unloaded by the use of heavy ripping equipment and wheel tractor-scrapers with pusher tractors or that can be excavated and dumped into place or loaded onto hauling equipment by means of excavators having a rated capacity of one cubic yard and equipped with attachments (such as shovel, bucket, back hoe, drag line or clam shell) appropriate to the character of the materials and the site conditions.

Rock excavation shall be defined as the excavation of all head, compacted or cemented materials the accomplishment of which requires blasting or the use of excavators larger than defined for common excavation. The excavation and removal of isolated boulders or rock fragments larger than one cubic yard in volume encountered in materials other wise conforming to the definition of common excavation shall be classified as rock excavation.

Excavation will be classified according to the definitions by the engineer, based on his judgment of the character of the material and the site conditions.

The presence of isolated boulders or rock fragments larger than one cubic yard in size will not in itself be sufficient cause to change the classification of the surrounding material.

For the purpose of this classification, the following definitions shall apply:

Heavy ripping equipment shall be defined as a rear mounted, heavy duty, single tooth, ripping attachment mounted on a tractor having a power rating of 200-300 net horsepower (at the flight wheel).

Wheel tractor-scraper shall be defined as a self-loading (not elevating) and unloading scraper having a struck bowl capacity of 12-20 yards.

Pusher tractor shall be defined as a track type tractor having a power rating of 200-300 net horsepower (at the flywheel) equipped with appropriate attachments.

3. UNCLASSIFIED EXCAVATION

Items designated as "Unclassified Excavation" shall include all materials encountered regardless of their nature or the manner in which they are removed. When excavation is unclassified, none of the definitions or classifications stated in Section 12 of this specification shall apply.

4. BLASTING

The transportation, hauling, storage, and use of dynamite and other explosives shall be directed and supervised by a person of proven experience and ability in blasting operations.

5. USE OF EXCAVATED MATERIALS

Method 1

To the extent they are needed, all suitable materials from the specified excavations shall be used in the construction of required permanent earth fill or rock fill. The suitability of materials for specific purposes will be determined by the Engineer. The Contractor shall not waste of otherwise dispose of suitable excavated materials.

Method 2

Suitable materials from the specified excavations may be used in the construction of required earth fill or rock fill. The suitability of materials for specific purposes will be determined by the Engineer.

6. DISPOSAL OF WASTE MATERIALS

Method 1

All surplus or unsuitable excavated materials will be designated as waste and shall be disposed of at the location shown on the drawings.

Method 2

All surplus or unsuitable excavated materials will be designated as waste and shall be disposed of by the Contractor at sites of his own choosing away from the site of the work.

7. BRACING AND SHORING

Excavated surfaces too steep to be safe and stable if unsupported shall be supported as necessary to safeguard the work and workmen, to prevent sliding or settling of the adjacent

ground, and to avoid damaging existing improvements. The width o f the excavation shall be increased if necessary space for sheeting, bracing, shoring, and other supporting installations. The Contractor shall furnish place and subsequently remove such supporting installations.

8. STRUCTURE AND TRENCH EXCAVATION

Structure or trench excavation shall be completed to the specified elevations and to sufficient length and width to include allowance for forms, bracing and supports, as necessary, before any concrete or earth fill is placed or any piles are driven within the limits of the excavation.

9. BORROW EXCAVATION

When the quantities or suitable materials obtained from specified excavations are insufficient to construct the specified fills, additional materials shall be obtained from the designated borrow areas. The extent and depth of borrow pits within the limits of the designated borrow areas shall be as directed by the Engineer.

Borrow pits shall be excavated and finally dressed in a manner to eliminate steep or unstable side slopes or other hazardous or unsightly conditions.

10. OVER EXCAVATION

Excavation in rock beyond the specified lines and grades shall be corrected by filling the resulting voids with portland cement concrete made of materials and mix proportions approved by the Engineer. Concrete that will be exposed to the atmosphere when construction is completed shall contain not less than 6 bags of cement per cubic yard of concrete. The concrete shall be placed and cured as specified by the Engineer. Over excavation in other material shall be backfilled and fine graded with granular material having less than 15% fines.

11. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the volume of each type and class of excavation within the specified pay limits will be measured and computed to the nearest cubic yard by the method of average cross-sectional end areas. Regardless of quantities excavated, the measurement for payment will be made to the specified lines and grades directed by the Engineer to remove unsuitable material will be included, but only the extent the unsuitable conditions is not the result of the Contractor's operations.

Method 1

The pay limits shall be as designated on the drawings.

Method 2

The pay limits shall be defined as follows:

a. The upper limit shall be the original ground surface as it existed prior to the start of construction operations except that where excavations is performed within areas designated for previous excavation or fill the upper limit shall be modified ground surface resulting from the specified previous excavation or fill.
b. The lower and lateral limits shall be the neat lines and grades shown on the drawings.

Method 3

The pay limits shall be defined as follows:

a. The upper limit shall be the original ground surface as it existed prior to the start of construction operations except that where excavations is performed within areas designated for previous excavation or fill the upper limit shall be modified ground surface resulting from the specified previous excavation or fill.
b. The lower and lateral limits shall be the true surface of the completed excavation as authorized by the Engineer.

Method 4

The pay limits shall be defined as follows:

a. The upper limit shall be the original ground surface as it existed prior to the start of construction operations except that where excavations is performed within areas designated for previous excavation or fill the upper limit shall be modified ground surface resulting from the specified previous excavation or fill.
b. The lower limit shall be at the bottom surface of the proposed structure.
c. The lateral limits shall be 18-inches out side of the outside surfaces of the proposed structure or shall be vertical planes 18-inches outside of and parallel to the footings, whichever gives the larger pay quantity, except as provided in d, below.
d. For trapezoidal channel linings or similar structures th at are to be supported upon the sides of the excavation without intervening forms, the lateral limits shall be at the under side of the proposed lining or structure.
e. For the purpose of the definitions in b, c, and d, above, any specified bedding or drain fill directly beneath or beside the structure will be considered to be part of the structure.

12. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in accordance with this specification and the construction

details thereof are as follows:

a. Bid Item 3, Excavation

1. This item shall consist of excavation necessary for the construction of the permanent works in accordance with the specifications and plans or as directed by the Engineer. The work shall include transporting and wasting the material as defined in Section 6 Method 2 as shown on the plans.

2. This item shall also include the removal of concrete and asphalt as shown on the drawings or as directed by the Engineer.

3. The excavation for the curb and gutter, parking lot, retention pond, and road shall be finished to the lines, grades, and typical sections shown on the plans or as directed. Method 2 disposal of waste material will apply. Excavation operations shall be conducted so that material outside of the limits will not be disturbed, unless otherwise directed.

4. The site shall be maintained in such conditions that the work shall be well drained at all times, including periods of work suspension.

5. Contractor will be required to remove all trees from the construction site.

6. Contractor will be required to dispose of all existing concrete and asphalt at an approved site.

7. Excavation and construction of the retention pond will be subsidiary to excavation and will not be paid for separately.

8. Measurement for the excavation will be by the square foot.

9. Payment will constitute full compensation for labor, equipment, tools and all other items necessary and incidental to the performance of the work.

CONSTRUCTION SPECIFICATION

23. EARTH FILL

1. SCOPE

The work shall consist of the construction of earth embankments and other earth fills required by the drawings and specifications.

2. MATERIALS

All fill materials shall be obtained from required excavations and designated borrow areas. The selection, blending, routing and disposition of materials in the various fills shall be subject to approval by the Engineer.

Fill materials shall contain no sod, brush, roots or other perishable materials. Rock particles larger than the maximum size specified for each type of fill shall be removed prior to compaction of the fill.

The type of material used in the various fills shall be as listed and described in the specifications and drawings.

3. FOUNDATION PREPARATION

Foundations for earth fill shall be stripped to remove vegetation and other unsuitable materials or shall be excavated as specified.

Except as otherwise specified, earth foundation surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill or otherwise acceptably scored and loosened material shall be controlled as specified for the earth fill, and the surface materials of the foundation shall be compacted and bonded with the first layer of earth fill as specified for subsequent layers of earth fill.

Earth abutment surfaces shall be free of loose, uncompacted earth in excess of two inches in depth normal to the slope and shall be at such a moisture content that the earth fill can be compacted against them to effect a good bond between the fill and the abutments.

Rock foundation and abutment surfaces shall be cleared of all loose materials by hand or other effective means and shall be free of standing water when fill is placed upon them.

Occasional rock outcrops in earth foundations for earth fill, except in dams and other structures designed to restrain the movement of water, shall not require special treatment if they do not interfere with compaction of the foundation of initial layers of the fill or the bond between the foundation and the fill.

Foundation and abutment surfaces shall be not steeper than 1 horizontal to 1 vertical unless otherwise specified. Test pits or other cavities shall be filled with compacted earth fill conforming to the specifications for the earth fill to be placed upon foundation.

4. **PLACEMENT**

Fill shall not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by the Engineer. Fill shall not be placed upon a frozen surface, nor shall snow, ice, or frozen material be incorporated in the fill.

Fill shall be placed in approximately horizontal layers, The thickness of each layer before compaction shall not exceed the maximum thickness specified. Materials placed by dumping in piles or windows shall be spread uniformly to no more than the specified thickness before being compacted. Hand compacted fill, including fill compacted by manually directed power tampers, shall be placed in layers whose thickness before compaction does not exceed 4-inches.

Adjacent to structures, fill shall be placed in a manner which will prevent damage to the structures and will allow the structures to assure the loads from the fill gradually and uniformly. The height of the fill adjacent to a structure shall be increased at approximately the same rate on all sides of the structure.

Earth fill in dams, levees and other structures designed to restrain the movement of water shall be placed so as to meet the following additional requirements:

a. The distribution of materials throughout each zone shall be essentially uniform, and the fill shall be free from lenses, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material.

b. If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill to a depth of not less than 2 inches before the next layer is placed.

c. The top surface of embankments shall be maintained approximately level during construction, except that a crown of cross-slope of not less than 2 percent shall be maintained to insure effective drainage, and except as otherwise specified for drain fill zones. If the drawings or specifications require or the Engineer directs that the fill be placed at a higher level in one part of an embankment than another, the top surface of each part shall be maintained as specified above.

d. Dam embankments shall be constructed in continuous layers from abutment to abutment except where openings to facilitate construction or to allow the passage of stream flow during construction is specifically authorized in the contract.

e. Embankment built at different levels as described under c or d above shall be constructed so that the slope of the bonding surfaces between embankment to be placed is not steeper than 3 feet horizontal to 1 foot vertical. The bonding surface of the embankment in place shall be stripped of all loose material, and shall be scarified, moistened and recompacted when the new fill is placed against it as needed to insure a good bond with the new fill and to obtain the specified moisture content and density in the junction of the place and new fill.

5. CONTROL OF MOISTURE CONTENT

During placement and compaction of fill, the moisture content of the materials being placed shall be maintained within the specified range.

The application of water to the fill materials shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the materials after placement on the fill, if necessary. Uniform moisture distribution shall be obtained by dicing, blending or other approved methods prior to compaction of the layer.

Material that is too wet when deposited on the fill shall either be removed or be dried to the specified content prior to compaction.

If the top surface of the preceding layer of compacted fill or a foundation or abutment surface in the zone of contact with the fill becomes too dry to permit suitable bond it shall be scarified and moistened by sprinkling to an acceptable moisture content prior to placement of the next layer of fill.

6. COMPACTION

Earth fill shall be compacted according to the following requirements for the class of compaction specified:

Class A compaction. Each layer of fill shall be compacted as necessary to make the density of the fill matrix not less than the minimum density specified. The fill matrix is defined as the portion of the fill material finer that the maximum particle size used in the compaction test method specified.

Class B compaction. Each layer of fill shall be compacted as to a mass density not less than the minimum density specified.

Class C compaction. Each layer of fill shall be compacted by the specified number of passes of the type and weight of roller or other equipment specified or by an approved equivalent method. Each pass shall consist of at least one passage of the roller wheel or drum over the entire surface of the layer.

Fill adjacent to structures shall be compacted a density equivalent to that of the surrounding fill by means of hand tamping if permitted by the Contracting Officer, or manually directed power tampers or plate vibrators. Heavy equipment shall not be operated within 2 feet of any structure. Vibrating rollers shall not be operated within 5 feet of any structure. Compaction by means of drop weights operating from a crane or hoist will not be permitted.

The passage of heavy equipment will not be allowed: (1) over cast-in-place conduits prior to 14 days after placement of the concrete; (2) over cradled precast conduits prior to 7 days after placement of the concrete cradle, or (3) over any type of conduit until the backfill has been placed above the top surface of the structure to a height equal to one-half the clear span width of the structure or pipe or 2 feet, whichever is greater.

Compacting of fill adjacent to structures shall not be started until the concrete has attained the strength specified in Specification No. 32, Concrete, for this purpose.

The strength will be determined by compression testing of test cylinders cast by the Engineer for this purpose and cured at the work site in the manner specified in ASTM Method C 31 for determining when a structure may be put into service.

When the required strength of the concrete is not specified as described above, compaction of fill adjacent to structures shall not be started until the following time intervals have elapsed after placement of the concrete.

Structure	Time Interval
Retaining walls and counterforts	14 days
Walls backfilled on both sides simultaneously	7 days
Conduits and spillway risers, cast-in-place (with inside forms in place)	7 days
Conduits and spillway risers, cast-in-place (inside forms removed)	14 days

Structure	Time Interval
Conduits, precast & cradled	2 days
Conduits, precast & bedded	1 day

Antiseep collars and cantilever outlet bents	3 days

7. REMOVAL AND PLACEMENT OF DEFECTIVE FILL

Fill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the specifications shall be reworked to meet the requirements or removed and replaced by acceptable fill. The replacement fill and the foundation, abutment and fill surfaces upon which it is placed shall conform to all requirements of this specification for foundation preparation, approval, placement, moisture control and compaction.

8. TESTING

During the course of the work, the Contractor will perform such tests as are required to identify materials, to determine compaction characteristics, to determine content, and to determine density of fill in place. These tests performed by the Contractor will be used to verify that the fills conform to the requirements of the specifications.

Densities of fill requiring Class A compaction will be determined by the Engineer in accordance with ASTM Method D 1556 (or by equivalent methods), except that the volume and moist weight of included rock particles larger than those used in the compaction test method specified for the type of fill will be determined and deducted from the volume and moist weight of the total sample prior to computation of density. The density so computed will be used to determine the percent compaction of the fill matrix.

9. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the volume of each type and compaction class of earth fill within the specified zone boundaries and pay limits will be measured and computed to the nearest cubic yard by the method of average cross-sectional end areas. Unless otherwise specified, no deduction in volume will be made for embedded conduits and appurtenances.

The pay limits shall be as defined below, with the further provision that earth fill required to fill voids resulting from over-excavation of the foundation, outside specified lines and grades, will be included in the measurement for payment only where such over-excavation is directed by the Engineer to remove unsuitable material and where the unsuitable condition is not a result of the Contractor's operations.

(Method 1) The pay limits shall be as designated on the drawings.

(Method 2) The pay limits shall be the measured surface of the foundation when

approved for placement of the fill and the specified neat lines of the fill surface.

(Method 3) The pay limits shall be the measured surface of the foundation when approved for placement of the fill and the measured surface of the completed fill.

(Method 4) The pay limits shall be the specified pay limits for excavation and the specified neat lines of the fill surface.

(Method 5) The pay limit shall be the specified pay limits for excavation and the measured surface of the completed fill.

(Use Method 6 or 7 with all Methods 1 through 5)

(Method 6) Payment for each type and compaction class of earth fill will be made at the contract unit price for that type and compaction class of fill. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the performance of the work.

(Method 7) Payment for each type and compaction class of earth fill will be made at the contract unit price for that type and compaction class of fill. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the performance of the work, except furnishing, transportation, and applying water to the foundation and fill materials.

Water applied to the foundation and fill materials will be measured and payment will be made as specified in Construction Specification.

(Use with All Methods) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 10 of this specification.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 4, Granular Borrow (Pit Run)

1. This item shall consist of providing, placing, watering, blading and compacting the granular borrow to the lines and grades shown on the drawings or as staked in the field.

2. The Contractor shall supply the granular borrow. Granular borrow shall consist of granular material, non-plastic conforming to the following

gradation:

Sieve Size	Min % Passing	Max % Passing
8"	80	100
4"	50	70
2"	30	60
#4	10	30
#200	8	15

A shale or shale derivative will not be used. The granular borrow must be approved by the Engineer prior to placement.

3. Compaction shall be by Method A. The earth foundation shall be moistened and compacted to acquire at least ninety-five percent (95%) of the maximum density as determined in accordance with ASTM 1556, method D.

4. The material shall be placed and compacted at optimum moisture content within a range of ± 2%.

4. The Contractor shall use the reference staking provided by the Engineer to establish the finished elevation of the granular fill.

5. Section 9, measurement and payment will not apply. Measurement will be made by the square foot area to the depth shown on the drawings. Payment will be made at the contract unit price and will constitute full compensation for all materials, equipment, labor, and all other items incidental to the completion of the work.

b. Bid Item 5, Untreated Base Course, (1-inch Max.), 6-inches Thick

1. This item shall consist of providing, placing, watering, blading and compacting the untreated base course to the lines and grades as shown on the drawings or staked in the field.

2. The dry mineral aggregate shall conform to the following 1-inch gradation:

1 inch Gradation

Sieve Size	% Passing Gradation Band
1"	100
½"	79-91
#4	49-61
#16	27-35
#200	7-11

Variation to the above Gradation Schedule must be approved in writing by the Engineer.

3. The base course gravel shall uniformly be mixed with water prior to compaction.

4. Compaction shall be by Method A. If placed on native ground, the earth foundation shall be moistened and compacted to acquire at least ninety-five percent (95%) of the maximum density as determined in accordance with ASTM 1556, method D.

5. The aggregate shall have a percentage wear not exceeding 50% when tested in accordance with ASSHTO designation T-96. Certification that the aggregate meets this wear test will be required of the Contractor prior to his placement of the base course.

6. The moisture content of the material at the time of compaction shall be between + 2% optimum and - 2% of optimum.

7. The Contractor shall select the borrow area and submit certification the material meets these specifications to the Engineer for approval.

8. Material must be non-plastic.

9. Measurement and Payment.
   a. The 1-inch Untreated Base Course shall be measured by the square foot placed in accordance with the typical sections as shown on the drawings.

   b. Payment for the 1-inch untreated base course will be made at the contract unit price. Such payment will constitute full compensation for furnishing, transporting and installing the 1-inch untreated base course and all other items necessary and incidental to the performance of the work.

CONSTRUCTION SPECIFICATION

32. CONCRETE FOR MINOR STRUCTURES

1. **SCOPE**

The work shall consist of furnishing, forming, placing, finishing and curing portland cement concrete as required to build the structure named in Section 24 of this Specification.

2. **MATERIALS**

Portland cement shall conform to the requirements of ASTM Specification C-150 for the specified type.

Aggregates shall conform to the requirements of ASTM Specification C-33 unless otherwise specified. The grading of coarse aggregates shall be as specified in Section 24.

Water shall be clean and free from injurious amounts of oil, salt, acid, alkali, organic matter or other deleterious substances.

Performed expansion joint filler shall conform to the requirements of ASTM Specification D 1752.

Waterstops shall conform to the requirements of the applicable ASTM specification for the specified kinds.

3. **CLASS OF CONCRETE**

Concrete for minor structure shall be classified as follows:

Class of Concrete	Maximum Water Content (gallons/bag)	Minimum Cement Content (bags/cu.yd.)
4000	7	6

4. **AIR CONTENT AND CONSISTENCY**

Unless otherwise specified, the slump shall be 2 to 4 inches. If air entrainment is specified, the air content by volume shall be 5 to 8 percent of the volume of the concrete. When specified or when directed by the Engineer, a water-reducing, set-retarding admixture approved by the Engineer shall be used.

5. DESIGN OF THE CONCRETE MIX

The proportions of the aggregates shall be such as to produce a concrete mixture that will work readily into the corners and angles of the forms and around reinforcement when consolidated, but will not segregate or exude free water during consolidation.

Prior to placement of concrete, the Contractor shall furnish the Engineer, for approval, a statement of the materials and mix proportions (including admixtures, if any) he intends to use. The statement shall include evidence satisfactory to the Engineer that the materials and proportions will produce concrete conforming to this specification. The materials and proportions so stated shall constitute the job mix. After a job mix has been approved, neither the source, character or grading of the aggregates nor the type or brand of cement or admixture shall be changed without prior notice to the Engineer. If such changes are necessary, no concrete containing such new or altered materials shall be placed until the Engineer has approved a revised job mix.

6. INSPECTION AND TESTING

The Engineer will have free entry to the plant and equipment furnishing concrete under the contract. Proper facilities shall be provided for the Engineer to inspect materials, equipment and processes and to obtain samples of the concrete. All tests and inspections will be conducted so as not to interfere unnecessarily with manufacture and delivery of the concrete.

7. HANDLING AND MEASUREMENT OF MATERIALS

Materials shall be stockpiled and batched by methods that shall prevent segregation or contamination of aggregates and insure accurate proportioning of the ingredients of the mix.

Cement shall be measured by weight or in bags of 94 pounds each. When cement is measured in bags, no fraction of a bag shall be used unless weighed.

Aggregates shall be measured by weight. Mix proportions shall be based on saturated, surface-dry weights. The batch weight of each aggregate shall be the required saturated, surface- dry weight plus the weight of surface moisture it contains.

Water shall be measured, by volume or by weight, to an accuracy within one percent of the total quantity of water required for the batch.

Admixtures shall be measured within a limit of accuracy of three percent.

8. MIXERS AND MIXING

Concrete shall be uniform and thoroughly mixed when delivered to the work. Variations in slump of more than 1 inch within a batch will be considered evidence of inadequate mixing and shall be corrected by increasing mixing time or other means.

For stationary mixers, the mixing item after all cement and aggregates are in the mixer drum shall not be less than 1 ½ minutes. When concrete is mixed in a truck mixer, the number of revolutions of the drum or blades at mixing speed shall be not less than 70 nor more than 100

No mixing water in excess of the amount called for by the job mix shall be added to the concrete during mixing or hauling or after arrival at the delivery point.

9. **FORMS**

Forms shall be of wood, plywood, steel or other approved material and shall be mortar tight. The forms and associated false work shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions and contours. Form surfaces shall be smooth and free from holes, dents, sags or other irregularities. Forms shall be coated with a nonstaining form oil before being set into place.

Metal ties or anchorages within the forms shall be equipped with cones, she-bolts or other devices that permit their removal to a depth of at least one inch without injury to the concrete. Ties designed to break off below the surface of the concrete shall not be used without cones.

All edges that will be exposed to view when the structure is completed shall be chamfered, unless finished with molding tools as specified in Section 18.

10. **PREPARATION OF FORMS AND SUBGRADE**

Prior to placement of concrete the forms and subgrade shall be free of chips, sawdust debris, water, ice, snow, extraneous oil, mortar, or other harmful substances or coatings.

Any oil on the reinforcing steel or other surfaces required to be bonded to the concrete shall be removed. Rock surfaces shall be cleaned by air-water cutting, wet sandblasting or wire brush scrubbing, as necessary, and shall be wetted immediately prior to placement of concrete. Earth surfaces shall be firm and damp. Placement of concrete on mud, dried earth or uncompacted fill frozen subgrade will not be permitted.

Unless otherwise specified, when concrete is to be placed over drain fill, the contact surface of the drain fill shall be covered with a layer of asphalt-impregnated building paper or polyvinyl sheeting prior to placement of the concrete. Forms for weepholes shall extend through this layer into the drain fill.

Items to be embedded in the concrete shall be positioned accurately and anchored firmly.

Weepholes in walls or slabs shall be formed with nonferrous materials.

11. CONVEYING

Concrete shall be delivered to the site and discharged into the forms within 1 ½ hours after the introduction of the cement to the aggregates. In hot weather or under conditions contributing to quick stiffening of the concrete, the time between the introduction of the cement to the aggregates and discharge shall not exceed 45 minutes. The Engineer may allow a longer time, provided the setting time of the concrete is increased a corresponding amount by the addition of an approved set-retarding admixture. In any case, concrete shall be conveyed from the mixer to the forms as rapidly as practicable by methods that will prevent segregation of the aggregates or loss of mortar. Concrete shall not be dropped more than five feet vertically unless suitable equipment is used to prevent segregation.

12. PLACING

Concrete shall not be placed until the subgrade, forms and steel reinforcement have been inspected and approved. No concrete shall be placed except in the presence of the Engineer. The Contractor shall give reasonable notice to the Engineer each time he intends to place concrete. Such notice shall be far enough in advance to give the Engineer adequate time to inspect the subgrade, forms, steel reinforcement and other preparations for compliance with the specifications before concrete is delivered for placing.

The concrete shall be deposited as closely as possible to its final position in the forms and shall be worked into the corners and angles of the forms and around all reinforcement and embedded items in a manner to prevent segregation of aggregates or excessive laitance. Unless otherwise specified, slab concrete shall be placed to design thickness in one continuous layer. Formed concrete shall be placed in horizontal layers not more than 20 inches thick. Hoppers and chutes, pipes or elephant trunks shall be used as necessary to prevent splashing of mortar on the forms and reinforcing steel above the layer being placed.

Immediately after the concrete is placed in the forms, it shall be consolidated by spading, hand tamping or vibration as necessary to insure smooth surfaces and dense concrete. Each layer shall be consolidated to insure monolithic bond with the preceding layer. If the surface of a layer of concrete in place sets to the degree that it will not flow and merge with the succeeding layer when spaded or vibrated, the Contractor shall discontinue placing concrete and shall make a construction joint according to the procedure specified in Section 13.

If placing is discontinued when an incomplete horizontal layer is in place, the unfinished end of the layer shall be formed by a vertical bulkhead.

13. CONSTRUCTION JOINTS

Construction joints shall be made at the location shown on the drawings. If construction joints are needed which are not shown on the drawings, they shall be placed in locations approved by the Engineer.

Where a feather edge would be produced at a construction joint, as in the top surface of a sloping wall, an insert form shall be used so that the resulting edge thickness on either side of the joint is not less than 6 inches.

In walls and columns, as each lift is completed, the top surfaces shall be immediately and carefully protected from any condition that might adversely affect the hardening of the concrete.

Steel tying and form construction adjacent to concrete in place shall not be started until the concrete has cured at least 12 hours. Before new concrete is deposited on or against concrete that has hardened, the forms shall be retightened. New concrete shall not be placed until the hardened concrete has cured at least 12 hours.

Surfaces of construction joints shall be cleaned of all unsatisfactory concrete, liatance, coating or debris by washing and scrubbing with a wire brush or wire broom or by other means approved by the Engineer. The surfaces shall be kept moist for at least one hour prior to placement of the new concrete.

14. EXPANSION AND CONTRACTION JOINTS

Expansion and contraction joints shall be made only at locations shown on the drawings.

Exposed concrete edges and expansion and contraction joints shall be carefully tooled or chamfered, and the joints shall be free of mortar and concrete. Joint filler shall be left exposed for its full length with clean and true edges.

Preformed expansion joint filler shall be held firmly in the correct position as the concrete is placed.

When open joints are specified, they shall be constructed by insertion and subsequent removal of a wooden strip, metal plate or other suitable template in such a manner that the corners of the concrete will not be chipped or broken. The edges of open joints shall be finished with an edging tool prior to removal of the joint strips.

15. WATERSTOPS

Waterstops shall be held firmly in the correct position as the concrete is placed. Joints in the metal waterstops shall be soldered, brazed or welded. Joints in rubber or plastic waterstops shall be cemented, welded or vulcanized as recommended by the Manufacturer.

16. **REMOVAL OF FORMS**

Forms shall not be removed without the approval of the Engineer. Forms shall be removed in such a way as to prevent damage to the concrete. Supports shall be removed in a manner that will permit the concrete to take the stresses due to its own weight uniformly and gradually.

17. **FINISHING FORMED SURFACES**

Immediately after the removal of the forms:

a. All fins and irregular projections shall be removed from exposed surfaces.

b. On all surfaces, the holes produced by the removal of form ties, cone-bolts, and she-bolts, shall be cleaned, wetted and filled with a dry-pack mortar consisting of one part portland cement, three parts sand that will pass a No. 16 sieve, and water just sufficient to produce a consistency such that the filling is at the point of becoming rubbery when the material is solidly packed.

18. **FINISHING UNFORMED SURFACES**

All exposed surfaces of the concrete shall be accurately screened to grade and then wood float finished, unless specified otherwise.

Excessive floating or troweling of surfaces while the concrete is soft shall not be permitted.

The addition of dry cement or water to the surface of the screened concrete to expedite finishing shall not be allowed.

Joints and edges on unformed surfaces that will be exposed to view shall be chamfered or finished with molding tools.

19. **CURING**

Concrete shall be prevented from drying for a curing period of at least 7 days after it is placed. Exposed surfaces shall be kept continuously moist for the entire period, or until curing compound is applied as specified below. Moisture shall be maintained by sprinkling, flooding, or fog spraying or by covering with continuously moistened canvas,

cloth mats, straw, sand or approved material. Wood forms (except plywood) left in place during the curing period shall be kept wet. Formed surfaces shall be thoroughly wetted immediately after forms are removed and shall be kept wet until patching and repairs are completed. Water or covering shall be applied in such a way that the concrete surface is not eroded or otherwise damaged.

Concrete, except at construction joints, may be coated with an approved curing compound in lieu of continued application of moisture. The compound shall be sprayed on the moist concrete surfaces as soon as free water has disappeared, but shall not be applied to any; surface until patching, repairs and finishing of that surface are completed. The compound shall be applied at a uniform rate of not less than one gallon per 150 square feet of surface and shall form a continuous adherent membrane over the entire surface. Curing compound shall not be applied to surfaces requiring bond to subsequently placed concrete, such as construction joints, shear plates, reinforcing steel and other embedded items. If the membrane is damaged during the curing period, the damaged area shall be resprayed at the rate of application specified above.

20. REMOVAL OF REPAIR

When concrete is honeycombed, damaged or otherwise defective, the Contractor shall remove and replace the structure or structural member containing the defective concrete or, where feasible, correct or repair the defective parts. The Engineer will determine the required extent of removal, replacement or repair.

Prior to starting repair work the Contractor shall obtain the Engineer s approval of his plan for effecting the repair. The Contractor shall perform all repair work in the presence of the Engineer.

21. CONCRETE IN COLD WEATHER

Concrete shall not be mixed nor placed when the daily minimum atmospheric temperature is less than 40 F unless facilities are provided to prevent the concrete from freezing. The use of accelerators or antifreeze compounds will not be allowed.

22. CONCRETE IN HOT WEATHER

The Contractor shall apply effective means to maintain the temperature of the concrete below 90 F during mixing, conveying and placing.

23. PRICE ADJUSTMENTS FOR STRENGTH

When concrete is below specified strength:

1. Owner may accept item at a reduced price.

2. The pay factor will be applied to the portion of the item which is represented by the strength tests that fall below specified strength.
3. Owner will calculate the pay factor as follows:

Psi below specified strength:	**Pay Factor:**
1 - 100	0.98
101 - 200	0.94
201 - 300	0.88
301 - 400	0.80
More than 400	0.50 or Engineer may reject

24. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, concrete will be measured to the neat lines shown on the drawings and the volume of the concrete will be computed to the nearest 0.1 cubic yard. Measurement of concrete placed against the sides of an excavation without the use of intervening forms will be made only to the neat lines or pay limits shown on the drawings. No deduction in volume will be made for chamfers, rounded or beveled edges or for any void or embedded item that is less than 3 cubic feet in volume.

Payment for each item of concrete for minor structures will be made at the contract unit price or the contract lump sum, whichever is applicable, for that item. Such payment will constitute full compensation for all labor, materials, equipment, transportation, tools, forms, false work, bracing and all other items necessary and incidental to the completion of the work, except items listed for payment elsewhere in the contract.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 24 of this specification.

25. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details include:

a. Bid Item 6, In-let Box Type 1 and Type 2I

1. This item shall consist of furnishing, and placing the concrete and reinforcing steel as required to construct the drainage inlet boxes and concrete structures, as required and as shown on the drawings, along with the necessary excavation, forming and curing to the lines and grades shown on the drawings or as directed by the Engineer.

2. All cement used shall be Type II, meeting the requirements of ASTM C 150.

3. Concrete mix design will be in accordance with Section 5.

4. Class 2 course aggregate shall be size 57 (1" to No. 4, ASTM C-33 Table II).

5. Air entrainment shall be required. Air content by volume shall be 5 to 8 percent of the volume of the cement.

6. The foundation shall be clean and free of all foreign material. The earth foundation shall be moistened and compacted to acquire at least 95 percent (95%) of the maximum density as determined in accordance with AASHTO Designation T-99, Method D.

7. Contractor will be required to apply curing compound as soon as finishing has been completed.

8. All concrete shall be reinforced. Reinforcing steel shall be Grade 60 and will be required as shown on the drawings or as directed and will not be paid for separately, but will be subsidiary to this item. Number four bar will be overlapped 18-inches.

9. All type 2 boxes will require a D&L #I-3518 curb inlet catch basin frame and grate.

10. The grade of the inlet boxes and the concrete structures shall be set in the field by the Engineer. The final grade of the drainage box shall match the grade of the curb and gutter and the future asphalt surface.

11. Measurement shall be based upon the number of boxes actually installed according to these specifications. Payment will be made according to the contract unit price for each box installed. Such payment shall constitute full compensation for all labor, materials (including excavations and backfill, equipment, transportation and all other items necessary and incidental to the completion of the work.

b. <u>Bid Item 7, Concrete Curb and Gutter (24-inch)</u>
<u>Bid Item 8, Concrete Curb and Gutter (30-inch)</u>

1. These items shall consist of furnishing and placing the portland cement concrete as required to construct the curb and gutter, as required and as shown on the drawings along with the necessary excavation and fill.

2. 3-inches of compacted base course shall be required under all new curb and gutter. The base course shall meet the requirements of the Untreated Base Course bid item and shall be subsidiary to the Concrete Curb and Gutter bid item.

3. All cement used shall be Type II.

4. Concrete shall be class 4000.

5. Concrete mix design will be in accordance with Section 5.

6. Minimum cement content will be six bags per cubic yard.

7. Course aggregate and fine aggregate shall comply with ASTM C-33. Course aggregate shall be size 57 (1" to No. 4, ASTM C-33 Table II).

8. Air entrainment shall be required. Air content by volume shall be five to eight percent of the volume of the concrete.

9. Fly ash will not be allowed in the concrete.

10. Water sprinkled on the surface of the concrete for finishing purposes will not be permitted.

11. Contractor shall be required to apply curing compound as soon as finishing has been completed.

12. Any new curb and gutter damaged during construction will be replaced, at the Contractor s expense.

13. All excavation and fill required to construct the curb and gutter is subsidiary to this item and will not be paid for separately.

14. Measurement and payment will be measured by the linear foot of each item actually installed. Payment for each item will be made at the contract unit price for that item. The payment will constitute full compensation for all labor, materials, equipment, transportation, tools, forms, bracing, excavation, compacted fill, and all other items incidental to the completion of the concrete work.

CONSTRUCTION SPECIFICATION

43. CORRUGATED POLYETHYLENE PIPE, 12 TO 36-INCH DIAMETER (ADS)

1. SCOPE

1.1 This specification covers the requirements and methods of tests for corrugated polyethylene (PE) pipe, couplings, and fittings for use in surface and subsurface drainage applications.

1.1.1 Nominal sizes of 12 to 36-inches (305 to 915 mm) are included.

1.1.2 Materials, workmanship, dimensions, pipe stiffness, environmental stress crack resistance, joining systems, brittleness, and form of markings are specified.

1.2 Corrugated polyethylene pipe is intended for surface and subsurface drainage applications where soil provides support to its flexible walls. Its major use is to collect or convey drainage water by open gravity flow, as culverts, storm drains, etc.

2. MATERIALS

2.1 AASHTO Designation M 294-90.

2.2 ASTM Standards

D618 Conditioning Plastics and Electrical Insulating Materials for Testing
D883 Terms Relating to Plastics
D1248 Polyethylene Plastics Molding and Extrusion Materials
D1693 Environmental Stress Cracking of Ethylene Plastics
D2122 Determining Dimensions of Thermoplactic Pipe and Fittings
D2412 Determination of Extern al Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
D2444 Test for Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
F412 Terms Relating to Plastic Piping Systems

3. CLASSIFICATION

3.1 The corrugated Polyethylene Pipe covered by this specification is classified as follows:

3.1.1 Type C - This pipe shall have a full circular cross-section, with a corrugated surface both inside and outside. Corrugations may be either annular or helical.

3.1.2 Type S - This pipe shall have a full circular cross-section, with an outer corrugated pipe wall and a smooth inner liner. Corrugations may be either annular or helical.

3.1.3 Type CP - This pipe shall be Type C with perforations as specified in Section 5.3.

3.1.4 Type SP - This pipe shall be Type S with perforations as specified in Section 5.3.

4. MATERIALS

4.1 Basic Materials:

4.1.1 Extruded pipe and blow molded fittings: Pipe and fittings shall be made of virgin PE compounds which conform with the requirements of Type III, Category 4 or 5, Grade P33, Class C; or Grade P34, Class C, as defined and described in ASTM D 1248.

4.1.2 Rotational Molded Pipe and Fittings: Pipe and fittings shall be made of virgin PE compounds which conform with the requirements of Type III, Category 3, Grade P33, Class C; for Grade P34, Class C, as defined and described in ASTM D 1248.

4.2 *Reworked Material* - Clean reworked material generated from the manufacturer's own production, when used by the manufacturer, shall meet the requirements for the type, category, grade, and class as described in 4.1.

5. REQUIREMENTS

5.1 Workmanship: The pipe and fittings shall be free of foreign inclusions and visible defects as defined herein. The ends of the pipe shall be cut squarely and cleanly so as not to adversely affect joining or connecting.

5.1.1 Visible Defects: Cracks, creases, un-pigmented or non-uniformly pigmented pipe are not permissible in the pipe as furnished.

5.2 Pipe Dimensions:

5.2.1 Nominal Size: The nominal size for the pipe and fittings is based on the nominal inside diameter of the pipe. Nominal diameters shall be 12, 15, 18, 21, and 24 inches (305, 380, 455, 535, 610, 760, and 915 mm).

5.2.2 Inside Diameter Tolerances: The tolerance on the specified inside diameter shall be 3% oversize and 1.5% undersize, but not more than ½ inch (12.7 mm) either oversize or undersize when measured in accordance with Section 7.6.1.

5.2.3 Length: Corrugated PE pipe may be sold in any length agreeable to the user. Lengths shall not be less than 99 percent of the stated quantity when measured in accordance with Section 7.6.2.

5.3 Perforations: When perforated pipe is specified, the perforations hall be cleanly cut so as not to restrict the inflow of water and uniformly spaced along the length an circumference of the pipe. Circular perforations hall not exceed 3.8 inch (9.5 mm) in diameter. The width of slots shall not exceed 1.8 inch (3.18 mm). The length of slots shall not exceed 2.5 inches (64 mm) for 12 inch and 15 inch pipe and 3.0 inch (77 mm) for pipe 18 inches (455 mm) diameter and larger. Perforations shall be placed in the valleys of the corrugations. The water inlet area shall be a minimum of 1.0 square inch per linear foot (2,117 mm^2/m) of pipe. All measurements shall be made in accordance with Section 7.6.3.

5.4 Pipe Stiffness: The pipe shall have a minimum pipe stiffness at five percent deflection as follow when tested in accordance with Section 7.1.

Diameter (Inches)	Pipe Stiffness (psi)
12 (305 mm)	45 (310 kPa)
15 (381 mm)	42 (289 kPa)
18 (457 mm)	40 (276 kPa)
21 (533 mm)	38 (262 kPa)
24 (610 mm)	34 (235 kPa)
30 (760 mm)	28 (193 kPa)
36 (915 mm)	22 (152 kPa)

5.5 Pipe Flattening: There shall be no evidence of wall buckling, cracking, splitting, or delamination, when the pipe is tested in accordance with Section 7.2.

5.6 Environmental Stress Cracking: There shall be no cracking of the pipe when tested in accordance with Section 7.4.

5.7 Brittleness: Pipe specimens shall not crack or split when tested in accordance with Section 7.3. Five non-failures out of six impacts will be acceptable.

5.8 Fitting Requirements:

5.8.1 The fittings shall not reduce or impair the overall integrity or function of the pipe line.

5.8.2 Common corrugated fittings include in-line joint fittings, such as couplings and reducers, and branch or complimentary assembly fittings such as tees, wyes, and end caps. These fittings are installed by various methods, such as snap-on, screw-on, and wrap around. Only fittings supplied or recommended by the pipe manufacturer should be used.

5.8.3 All fittings shall be within an overall length dimensional tolerance ± 0.5 inch (± 12.7 mm) of the manufacturer's specified dimensions when measured in accordance with Section 7.6.2.

5.8.4 Fittings shall not reduce the inside diameter of the pipe being joined by more than 0.5 inch (12.7 mm). Reducer fittings shall not reduce the cross-section area of the small size.

5.8.5 Couplings shall be corrugated to match the pipe corrugations and shall provide sufficient longitudinal strength to preserve pipe alignment and prevent separation at the joints Couplings shall be bell and spigot, split collar, or screw-on collar. Split collar couplings shall engage at least one full corrugation on each pipe section and screw on collars shall be in width at least one-half the nominal diameter of the pipe.

5.8.6 Pipe connections shall not separate to create a gap exceeding 3/16 inch (4.8 mm) when measured in a radial direction between pipe and coupling, or between tongue and groove portions of pipe, when tested according to Section 7.5.1. Fittings shall not crack or delaminate.

5.8.7 The design of the fittings shall be such that when connected with the pipe, the axis of the assembly will be level and true when tested in accordance with Section 7.5.2.

6. CONDITIONING

6.1 Conditioning: Condition the specimen prior to test at 70 to 77 F (21 to 25 C) for not less than 40 hours in accordance with Procedure A in ASTM D 618 for those tests where conditioning is required, and unless otherwise specified.

6.2 Conditions: Conduct all tests at a laboratory temperature of 70 to 77 F (21 to 25C) unless otherwise specified herein.

7. TEST METHODS

7.1 Pipe Stiffness: Select a minimum of three (3) pipe specimens and test for pipe stiffness (PS), as described in ASTM D 2412 except for the following: (1) the test specimens shall be a minimum of one diameter length; (2) locate the first specimen in the loading machine with an imaginary line connecting the two seams formed by the corrugation mold (end view) parallel to the loading plates, when applicable. The specimen must lie flat on the plate within 1/8 inch and may be straightened by hand bending at room temperature to accomplish this. Use the first location as a reference point for rotation and testing of the other two specimens. Test each specimen in one position only; (3) the deflection Indicator shall be readable and accurate to ± 0.001 inch (0.02 mm); (4) the residual curvature found in tubing frequently results in an erratic initial load deflection curve. When this occurs, project the lineal portion of the load/deflection curve between 0 and 5% deflection until it intersects the deflection axis the point shall be considered as the origin of the load deflection curve. The parallel plates must exceed the length of the test specimen as specified above.

7.2 Pipe Flattening: Flatten the three pipe specimens from 7.1 until the vertical inside diameter is reduced by 20%. The rate of loading shall be the same as in Section 7.1. Examine the specimen with the unaided eye for cracking, splitting, or delamination while specimen is under load and also after removing the specimen from the loading frame. Wall buckling is indicated by reverse curvature in the pipe wall accompanied by a decrease in load carrying ability of the pipe.

7.3 Brittleness: Test pipe specimens in accordance with ASTM D 2444 except six specimens shall be tested, for six impacts shall be made on one specimen. In the latter case, successive impacts shall be separated by 120 degrees circumferentially and at least one foot longitudinally. Impact points shall be at least six inches from the end of the specimen. Use tup B weighing 5.5 pounds (2.5 kg); the height of drop shall be five feet (1.5 m). Use a flat plate specimen holder. Condition the specimens for 24 hours at a temperature of 25± 3.6 f (-3.9 ± 2 C), and conduct all tests within 60 seconds of removal from this atmosphere. The center of the falling tup shall strike on a corrugation crown for all impacts.

7.4 Environmental Stress Cracking: Test sections of the pipe for environmental stress cracking in accordance with ASTM d 1693, except for the following modifications:

7.4.1 Three (3) specimens shall be tested.

7.4.2 Each specimen shall consist of a 90 degree arc length of pipe as shown in Figure 1.

7.4.3 Bend the specimens to shorten the inside chord length 20 ± 1 percent and retain in this position using a suitable holding device. Determine the arc chord dimension (B) of the specimen under test as follows:

$B = 0.8A$

A = the inside chord dimension before bending.

B = the same dimension taken after bending.

7.4.4 Place the bent specimen in a container of suitable size and cover completely with a preheated wetting agent at 122 ± 3.6 F (50 C ± 2 C). Maintain this temperature for 24 hours, and then remove the sample and inspect immediately. The wetting agent used in this test shall be 100% "Igepal CO-630," a trade name for nonylphenoxy poly(ethyleneoxy)ethanol.

7.5 Fittings:

7.5.1 Joint Integrity: Assemble each fitting or coupling to the appropriate pipe in accordance with the manufacturer's recommendations. Use pipe samples at least 12 inches (300 mm) in length. In the case of tongue and groove connections, assemble a specimen at least 24 inches in length with the connection at the center. Load the connected pipe and fitting between parallel plates at the rate of 0.5 inch (1.27 mm) per minute until the vertical inside diameter is reduced by at least 20 percent of the nominal diameter of the pipe. Inspect for damage while at the specified deflection, and after load removal. Measure the maximum radial distance between pipe and fittings, or between tongue and groove, during test and after load removal.

7.5.2 Alignment: Assure that the assembly or joint is correct and complete. If the pipe is bent, it should be straightened prior to performing this test. Lay the assembly or joint on a flat surface and verify that it will accommodate straight-line flow.

7.6 Dimensions:

7.6.1 Inside Diameter: Measure the inside diameter of the pipe with a tapered plug in accordance with ASTM d 2122. Or measure the inside diameter of two sections, with a suitable device accurate to ± 1/8 inch at two random positions 90 degrees to each other, and average the four measurements.

7.6.2 Length: Measure pipe with any suitable device accurate to ± 1.4 inch (6.35 mm) in ten feet (3 m) (0.2 percent). Make all measurements on the pipe while it is stress-free and at rest on a flat surface in a straight line.

7.6.3 Perforations: Measure dimensions of perforations on a straight specimen with no external forces applies. Make linear measurements with instruments accurate to 0.01 inch (0.2 mm).

8. MARKING

8.1 All pipe shall be clearly marked at intervals of no more than 10 feet (3 m) as follows:

8.1.1 Manufacturer's name or trademark

8.1.2 Nominal size.

8.1.3 This specification designation, AASHTO M 294.

8.1.4 The plant designation code.
8.1.5 The date of manufacture or an appropriate code.

8.2 Fittings shall be marked with the designation number of this specification, AASHTO M 294, and with the manufacturer's identification symbol.

9. QUALITY ASSURANCE

9.1 A manufacturer's certificate that the product was manufactured, tested, and supplied in accordance with this specification, together with a report of the test results, and the date each test was completed, shall be furnished upon request. Each certification so furnished shall be signed by a person authorized by the manufacturer.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 9, 12-inch ADS Pipe
Bid Item 10, 21-inch ADS Pipe

1. These items shall consist of furnishing, transporting, excavation, installation, and backfilling of the ADS pipe, as shown on the drawings, including all necessary appurtenances, ties, fittings, HMA, and untreated base as shown on the plans or as directed by the Engineer.

2. The pipe shall be installed to the lines and grades shown on the plans. Compaction of backfill in all trenches shall be according to Construction Specification No. 9, "Excavation and Backfill for Pipeline".

3. Bedding of the ADS pipeline will be with reject crusher sand as shown on the drawings, or as directed by the Engineer. Sand will not be paid for separately, but will be subsidiary to this bid item.

4. The minimum cover depth shall be according to grade and as directed by the Engineer.

5. The Contractor shall take care to protect the physical integrity of any existing buried utilities and services as detailed in Special Provisions.

6. Measurement and payment will be by the actual installed quantity installed, payment shall be made according to contract unit and unit price. Such payment shall constitute full compensation for all labor, materials

(including excavations, sand, HMA, untreated base and backfill), equipment, transportation and all other items necessary and incidental to the completion of the work.

CONSTRUCTION SPECIFICATION

91. FENCING AND GATES

1. SCOPE

a. The Contractor shall furnish and install the chain link and barbed wire fence and gates shown on the drawings and specified herein. Temporary fencing required, but not shown on the drawings, shall be as specified elsewhere.

b. The drawings show the location of the fences, but the Owner's Representative will establish and stake the exact line of these fences. The Contractor shall provide offset stakes as required for his use during construction.

c. Shop and installation drawings for the fences and gates shall be submitted in accordance with the requirements of the section on shop drawing submittal in the general provisions.

d. All ferrous materials shall be galvanized as hereinafter specified. Defective galvanized material or material upon which abrasion of the galvanizing has occurred shall not be used.

e. The Contractor shall furnish padlocks for the gates.

f. All earth, trees, brush, an other obstructions which interfere with the proper construction of fences shall be removed and disposed of, unless the Owner's Representative orders certain trees and brush to remain in place.

2. FENCING ALTERATIONS

a. The Contractor shall perform all fence removals, salvaging, maintaining and reinstallation of existing fencing, and other fencing alterations as shown on the drawings and specified.

b. Where existing fencing is required to be removed to permit pipelaying or other work to pass through, only that portion of the fence which would interfere with the progress of the pipelaying shall be removed. Sharp projecting ends of wire shall be knuckled to avoid hazard of cutting or sticking persons or animals contacting the cut fencing. Promptly after the pipelaying has passed through the fencing, the opening shall be closed and the fencing shall be repaired. Cutting of existing fencing shall be performed in a manner that will facilitate repair of the cut opening. All fence repairs shall be neat and securely fastened in place.

c. Fencing required to be maintained during construction shall not be cut or removed

for construction purposes, but shall be protected and maintained as an effective barrier to prevent the escape of livestock and the intrusion of unauthorized persons.

d. Fencing, gates, and metal posts required to be salvaged shall be carefully demounted. The demounted fencing shall be rolled into separate bundles not more than 30 inches in diameter and tied to prevent unrolling. All posts and fittings shall be salvaged to the maximum practicable extent. Steel drive posts and posts with concrete footings shall be pulled up and cleaned of dirt and concrete shall be removed. All posts shall be wire tied in bundles weighing not more than 100 pounds. Damaged or kinked fencing shall be disposed of by the Contractor. Salvaged fencing required to be reinstalled shall be stockpiled at the work site. Such stockpiled fencing shall be placed on wood runners or other raised surfaces. The locations of fencing storage shall be as directed by the Owner's Representative.

e. Promptly after being notified by the Owner's Representative, salvaged fencing shall be reinstalled at the locations shown on the drawings. Where required to complete the line of fencing, salvaged fencing shall be supplemented with new fencing. New fencing shall be furnished by the contractor and shall match the existing salvaged fencing as closely as practicable. Salvaged fencing shall be fitted with new posts and fittings where required to produce a complete and workmanlike installation.

3. **CHAIN LINK FENCING**

a. General

The chain link fencing shall be constructed with capped posts and top and bottom tension wires. Toprails will not be required except where replacing or matching an existing fence with a top rail.

b. Materials

1. Posts and Braces

a. Steel pipe used for posts and braces shall conform to the applicable requirements of ASTM A 120; other steel sections used for posts and braces shall be good commercial quality weldable steel. All fence posts shall be one piece without circumferential welds.

b. Posts and braces shall conform to the dimensions and weights shown in Table 206-6.2 of the 1976 edition of SSPWC, unless otherwise shown on the plans or required by permits.

c. All posts shall be fitted with tops designed to fit securely over the

posts and carry the top tension wire, except that the top of H-section and U-section posts may be open slotted in such a manner as to securely hold the top tension wire in position without vertical movement. Such slotting shall allow removal and replacement of a post without disturbing the top tension wire. Where slotted posts are used, the required slotting shall be performed prior to galvanizing. Tubular posts shall be fitted with watertight tops.

d. Changes in the fence line where the horizontal angle is 15 degrees or more shall be considered as corners and corner posts shall be installed. Changes in the grade where the vertical angle exceeds 5% shall have slope posts installed at the point of change.

e. Posts and braces shall be galvanized in accordance with the applicable requirements of ASTM A123.

f. Post tops, extension arms, stretcher bars, and other fittings and hardware shall be steel, malleable iron, or wrought iron and shall be galvanized in accordance with the applicable requirements of ASTM A513.

2. Fabric

Chain link fence fabric shall conform to the applicable requirements of ASTM A392, Class I. The wire used in the manufacture of the fabric shall be not lighter than 9 gauge, woven into a 2-inch mesh. The chain link fence fabric shall have a twisted and barbed finish on the top and bottom edges, unless otherwise noted.

3. Barbed Wire

The barbed wire for the three strands to be installed on the extension arms at the top of the fence and gates shall conform to the applicable requirements of ASTM A121, Class 2. The barbed wire shall consist of two strands of 12 ½ gauge wire, twisted with 4 point, 14 gauge barbs spaced not more than 5 inches apart.

4. Tension Wire

Between posts, the chain link fabric shall be fastened to a top and bottom tension wire of not lighter than 7 gauge galvanized, coil spring steel of good commercial quality.

5. Tie Wire

Tie wire shall be not lighter than 9 gauge galvanized steel wire. The use of approved galvanized steel bands will be permitted in lieu of tie wires for fastening the chain link fabric to the posts and gate frames.

6. Gates

   a. Gate frames for chain link fencing shall be constructed of not smaller than 2-inch, galvanized, standard weight pipe conforming to the applicable requirements of ASTM A 53. The gate frames shall be trussed with 3/8-inch adjustable truss rods. The corners of the gate frames shall be fastened together by welding. Welding shall conform to the applicable requirements of AWS. All welds shall be ground smooth and all welded assemblies shall be galvanized after welding.

   b. The same type of chain link fabric specified for the fence shall be attached to the gate frames by the use of the same type of stretcher bars and tie wires specified for the fence construction with suitable tension connectors spaced at approximately one foot intervals.

   c. The gates shall be provided with catch and locking devices as approved by the Owner's Representative for the service rendered.

   d. The gates shall be hung by at least two steel or malleable iron hinges not less than 3 inches in width, so attached as to securely clamp to the gate post and permit the gate to be swung as designed. The bottom hinge shall have a socket to take the ball end of the gate frame.

7. Construction

   Line posts shall be spaced at not more than ten foot intervals, measured from center to center of the posts. In determining the post spacing, measurement shall be made parallel to the slope of the natural ground, and all posts shall be placed in a vertical position.

8. Concrete for Footings

   a. All fence posts in earth shall be set in footings of 4-1/2-sack concrete conforming to the applicable requirements of the section on concrete construction.

   b. Concrete for footings shall be placed immediately after mixing. The method of placing the concrete shall be such that there will be no concentration of the large aggregates. The concrete shall be consolidated and compacted by tamping or vibrating in an approved

manner.

c. Concrete for footings may be placed without forms providing the ground is firm enough, in the opinion of the Owner's Representative, to permit excavation to the neat line dimensions shown on the drawings. Prior to placing the concrete, the earth around the hole shall be moistened. The concrete shall completely fill the hole and shall be crowned and smooth at the top.

d. Where the ground cannot be satisfactorily be excavated to neat line dimensions, forms shall be used for the footings. The forms shall be of material adequate to contain the concrete through final set. The forms and the bottom of the hole shall be moistened before the concrete is placed. As soon as the concrete has set sufficiently to maintain its shape, but no sooner than 24 hours after placing, the forms shall be removed and the footing excavation shall be backfilled with soil and solidly tamped.

e. Not less than seven days shall elapse after placing the concrete footings before the fence fabric is fastened to the posts.

9. Erection of Fence

a. End, corner, and gate posts shall be braced to the nearest line post with galvanized diagonal or horizontal braces used as compression members and galvanized 3/8 inch steel truss rods with turnbuckles used as tension members.

b. The chain link fabric shall be fastened on the side of the posts as directed by the Owner's Representative.

c. The fabric shall be stretched and securely fastened to the posts, and between posts, the top and bottom edges of the fabric shall be fastened to the tension wires. The tension wires shall be stretched tight with turnbuckles at the end and corner posts. The bottom tension wire shall be installed on a straight grade between posts.

d. The fabric shall be fastened to the end, corner, and gate posts with 1/4 inch by 3/4 inch stretcher bars and not smaller than 1/8 inch by 3/4 inch stretcher bar bands spaced on one foot intervals. The fabric shall be fastened to the line posts and tension wires with tie wires or metal bands. The wire or band fasteners shall be spaced a approximately 14 inches on line posts and at approximately 18 inches on tension wire.

4. **BARBED WIRE FENCING**

a. Materials

1. Posts

a. Metal posts for the barbed wire fence shall be steel pipe conforming to the requirements of the section on chain link fencing or they shall be hot dipped galvanized steel of any shape consisting of good commercial quality steel with a maximum carbon content of 0.82% and galvanized in accordance with the requirements of ASTM A123.

b. Posts shall be properly adapted, before galvanizing, to provide means for attaching the fencing to the posts in a manner that will not damage the posts or barbed wire.

c. Line posts shall not be less than 7 feet long and shall have a minimum resisting section modulus of 0.32 cubic inch in the direction perpendicular to the fence line and a minimum resisting section modulus of 0.12 cubic inch in the direction parallel to the fence line. Line posts shall be provided with tapered anchor plates attached securely thereto before galvanizing. The anchor plates shall have a minimum area of 30 square inches and shall be cut from not less than 8 gauge metal. The anchor plate may be omitted provided the post is set in a portland cement concrete footing with a minimum cross sectional dimension of 6 inches and a depth equal to full penetration of the post. End and corner posts shall be as specified in the section on chain link fencing.

d. Changes in the line where the angle of deflection is 10 degrees or more shall be considered as corners, and corner posts with concrete footings and one brace in each direction shall be installed.

2. Barbed Wire

a. General

Barbed wire shall conform to that specified in the section on chain link fencing.

b. Gates

Gates shall conform to the requirements of the section on chain link fencing; except frames shall be not smaller than 1 1/4 inches and the

truss braces shall be 1/4 inch. Gate frames may be constructed with bent frames as shown on the drawings, welded, or with malleable iron fittings designed for that purpose.

c. Construction

The barbed wire fence shall be constructed in accordance with the section on chain link fencing and as shown on the drawings.

5. MEASUREMENT AND PAYMENT

Measurement of fencing will be made to the nearest linear foot. Payment will be made at the contract unit price for fence installed according to plans and specifications which shall constitute full compensation for all labor, materials, and equipment required for completion of the work including gates, latches, locks and etc.

6. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details thereof are:

a. Bid Item 11, Fence Chain Link

1. This item shall consist of furnishing materials, equipment and labor required to install the fencing and gate as shown on the drawings or as directed by the Engineer.

2. All materials shall be new.

3. This item shall include the necessary gate, corner braces, line braces and gate braces as required.

4. Chain link fabric will be 9 gauge.

5. Seven gauge tension wire is required top and bottom.

6. 3-strand barb wire is required along with extension arms on top of fence.

7. One 10 foot gate is required as shown on the drawings. Gate will consist of ten foot chain link gate. The cost of the gate will be included in the fence bid item.

8. Measurement and Payment shall be at the contract unit and unit price per

linear foot of fence installed. Such payment shall constitute full and complete compensation for all work, materials and equipment necessary or incidental to completion of the work.